MORPHO

anatomy for artists

Clothing folds and creases

Michel **Lauricella**

rockynook

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artistic anatomy

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Morpho: Clothing Folds and Creases
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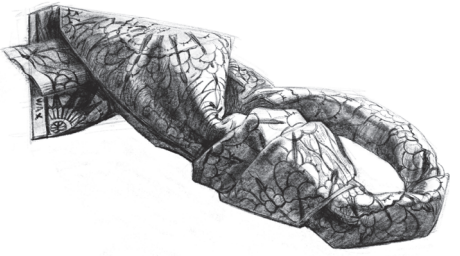
Soichi Sunami (1885–1971),
Martha Graham in Lamentation*, 1930*
Gelatin silver print, 9½ × 7½ in



foreword

"Draping" refers to the arrangement of the fabrics and folds of clothing represented in painting or in sculpture. It is an artistic motif that has been practiced since antiquity, and was almost a genre in itself in the hands of Leonardo da Vinci. Artists try to re-create the fabric's material and volume, relying on the quality of the light reflections and the greater or lesser fluidity of the curves.

Silk, linen, nylon, leather, etc. each have their own particular properties. When they are elastic or flexible, the fabrics and other materials used in fashion are drawn using lines that are fluid or taut; when the materials are stiff, the lines "snap."

But I did not choose "draping" for the title of this book. In calling it "Clothing Folds and Creases," I want to indicate that my approach is resolutely morphological. The issue here is to understand how the folds are formed and according to what constraints; to distinguish between "true" folds and "false folds" (i.e., creases); and to establish a catalogue of typical postures, along with typical items of clothing. In the context of this small volume, I cannot draw up an exhaustive inventory of current clothing items; even less can I enter into the history of costuming. I have most often chosen Western clothing. Through these items, we can illustrate how folds are created, making it easier for you to imagine modifications to the shapes depending on what your characters look like and what kind of clothing you are going to have them wear.

introduction

In the spirit of the other titles in this series, the "morpho" way is to simplify the various figures to the extreme, reduce their number to a few cases, and extract a simple and memorable logic from them in order to allow for realistic imaginative drawing. Thus, figures 1 through 5 illustrate the main shapes that we will find throughout the plates in this book.

Take a rectangle of fabric (figure 1), hang it up by two of its ends, and you will get the kinds of curved folds that can also be found on a piece of clothing suspended between two raised arms, a skirt resting on the thighs in a sitting position, or a simple poncho hung over shoulders.

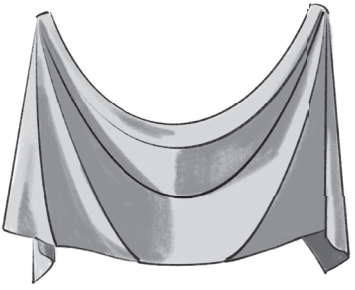
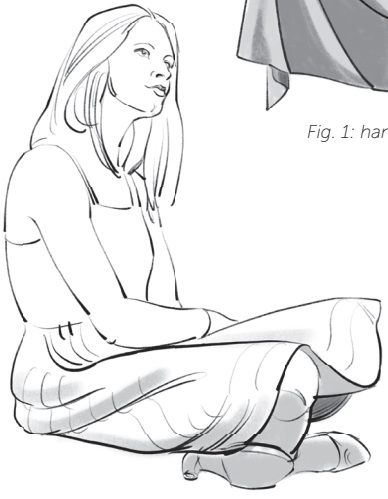


Fig. 1: hanging folds



Now imagine that you wrap a cylinder in fabric and then pull on it (figure 2). It will behave like a cord pulling on the shape. A number of different postures will make clothes behave in this way.

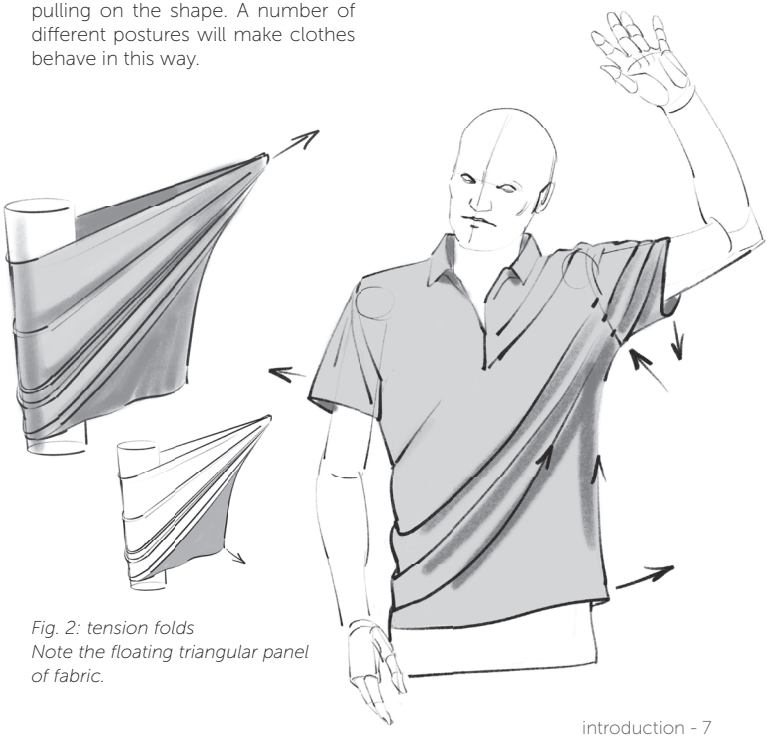


Fig. 2: tension folds
Note the floating triangular panel of fabric.

When someone lifts a leg or an arm, the tensions can be seen in the direction of the movement. A knot can also be the cause of tension folds.

Now wrap your cylinder in a tube of fabric and fold it (figure 3). This will automatically cause flexion folds to appear, directed toward the point of tension at the angle of the fold. Following the same logic as in the preceding case, we will also find the floating triangular panel of fabric reappearing here. A flexed limb will result in a similar shape.

We find this kind of fold on a pant leg as well as on a sleeve (as well as the floating panel of fabric, if the garment is not constrained at its extremity, for example by an elastic band or a cufflink).

Fig. 3: flexion folds

A tube of elastic fabric can contain a large volume. It stretches and then forms a series of perpendicular form-fitting folds. In the same way, two cylinders slid into a tube of fabric will, if we pull them apart, cause tensions that will bind the entire assemblage (figure 4).

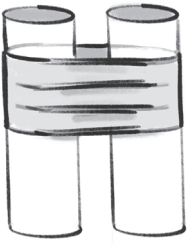
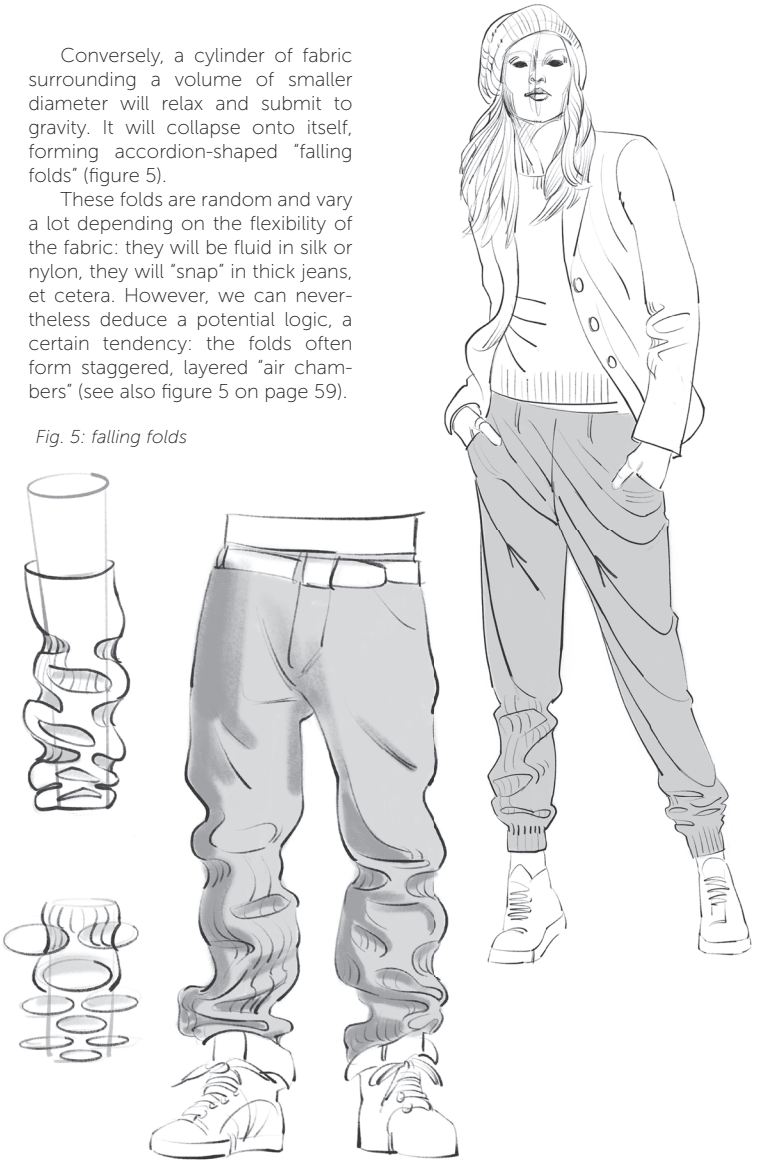


Fig. 4: form-fitting folds

Conversely, a cylinder of fabric surrounding a volume of smaller diameter will relax and submit to gravity. It will collapse onto itself, forming accordion-shaped "falling folds" (figure 5).

These folds are random and vary a lot depending on the flexibility of the fabric: they will be fluid in silk or nylon, they will "snap" in thick jeans, et cetera. However, we can nevertheless deduce a potential logic, a certain tendency: the folds often form staggered, layered "air chambers" (see also figure 5 on page 59).

Fig. 5: falling folds



Seams introduce constraints. They can become the point of tension, or they can stiffen an entire panel of the garment (figure 6, seam down the length of the leg), which will tend to complicate the drawing somewhat.

Fig. 6

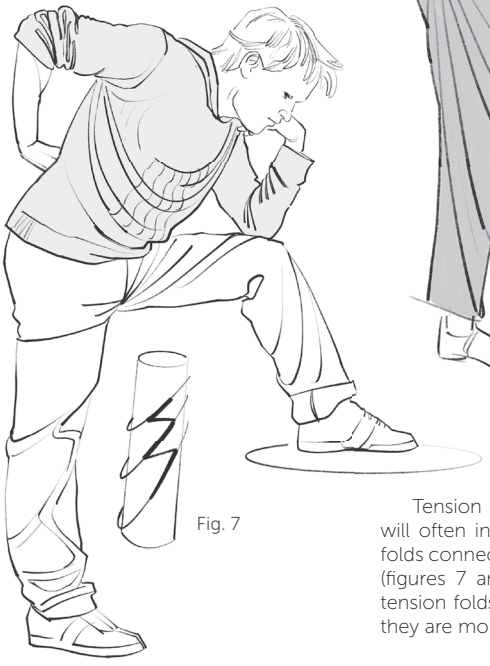


Fig. 7

Tension folds and falling folds will often interact. The two sets of folds connect like a network of veins (figures 7 and 8). I will emphasize tension folds in each case, because they are more expressive.

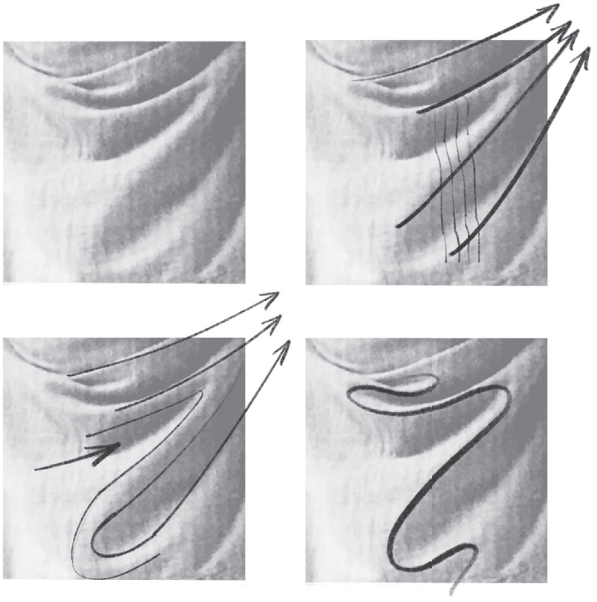


Fig. 8

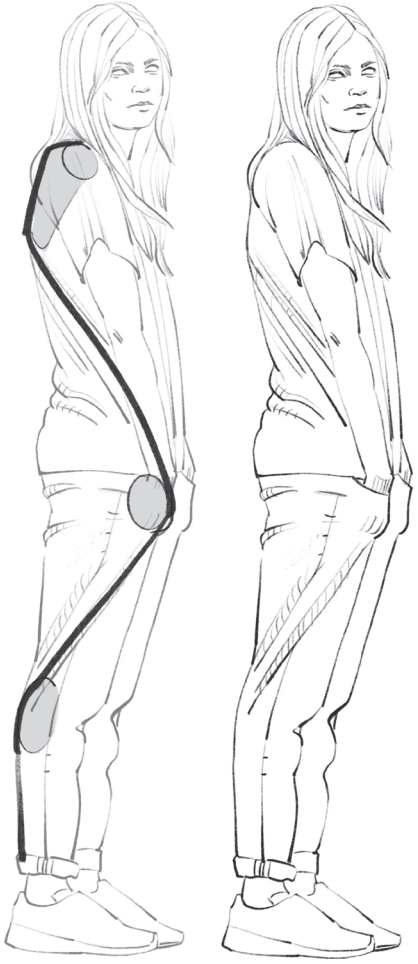
The drawings on the plates in the following pages are accompanied by a number of sketches. You will find many of them that correspond to the five cases mentioned above. The repetition of these sketches is the basis of the learning process offered here.

This book is organized to match the structure of the other books in this series. I start with the upper body: in the chapter on the "Head and Neck" you will find several examples of headwear and scarves. For that area, it will be sufficient to rely on the roundness of the head and to take note of a few examples of knots around the neck.

In the chapter on the "Torso," we will look at some simple garments, including T-shirts, but also clothes with buttons, each of which constitutes a tension point that is likely to pull on the fabric depending on the wearer's posture and body size. A strongly muscled body, a large chest, and body fat are all simple cases to be dealt with.

The chapter on the "Upper Limb" outlines the changes that follow from various positions of the arms, particularly when they are raised. Of course, it is to be expected that these tensions will continue onto the torso.

In the chapter on the "Lower Limb," long pants, shorts, and skirts are all represented in the most common postures of extension and flexion (especially in the seated position) to various degrees.



I hope that this presentation will be useful to you in your comprehension of the material. Don't lose sight of the expressive potential of clothing folds, which allow you to show lines of force inside the silhouette that will in turn, if they are in alignment with the attitude that you have chosen, reinforce the point you are making. A hand movement can have repercussions all the way to the back of the body and even down to the ground.

plates

head & neck

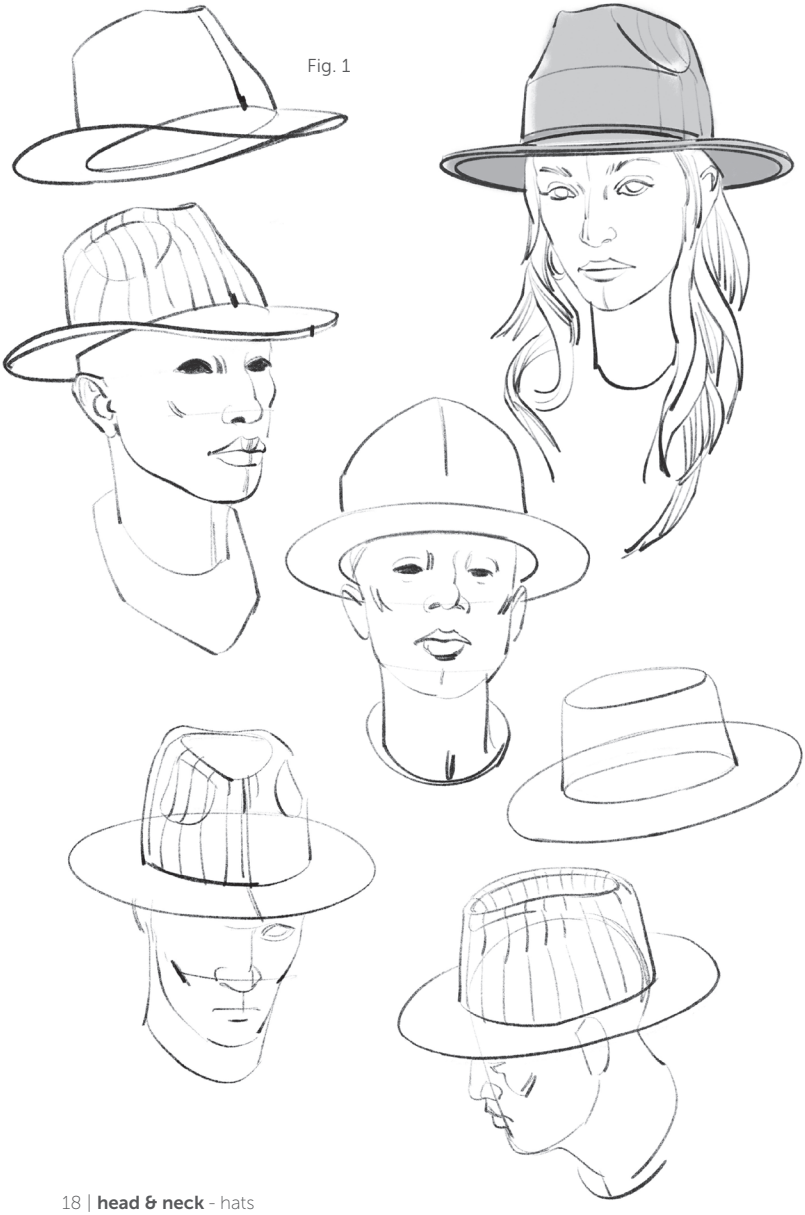


Fig. 1

Fig. 2

The morpho approach consists of not losing sight of the volume of the head and of establishing the axis of symmetry (fig. 1) or the radial system (arranged in spokes, or radii) of the seams (fig. 2).

Fig. 1

Figs. 1 and 2: the back of the cap escapes from the volume of the head and is subject to gravity.

Fig. 2

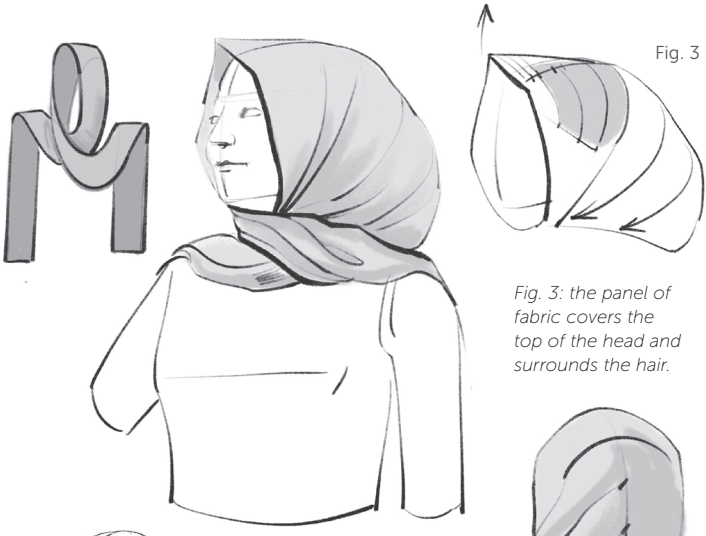


Fig. 3

Fig. 3: the panel of fabric covers the top of the head and surrounds the hair.

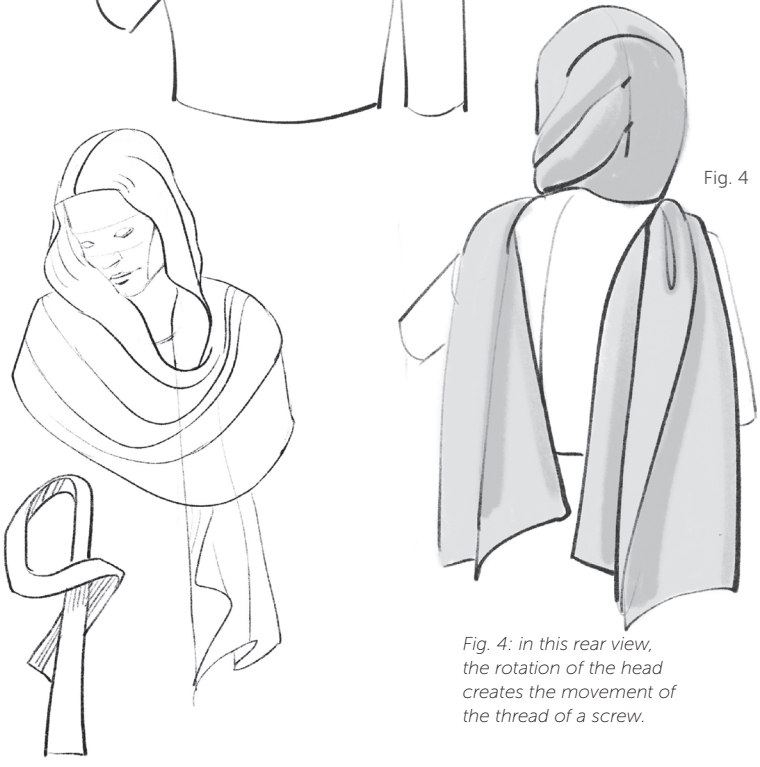
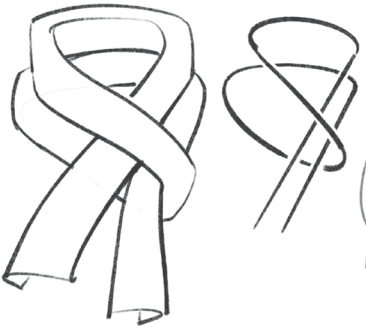
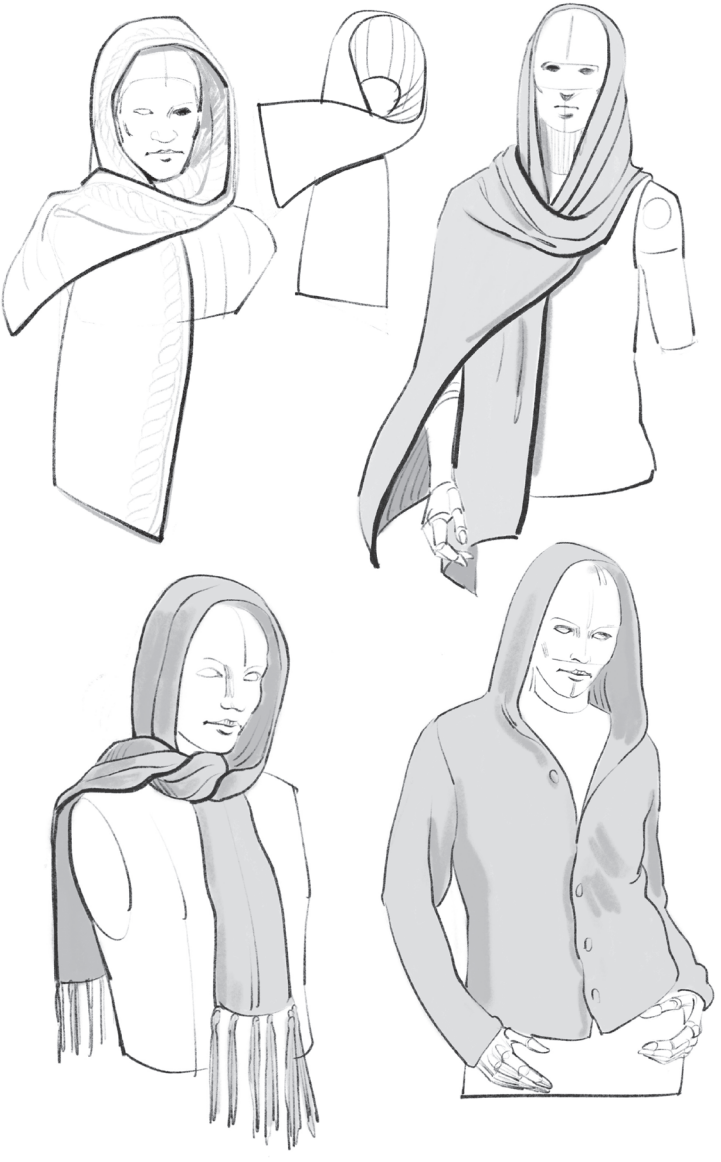


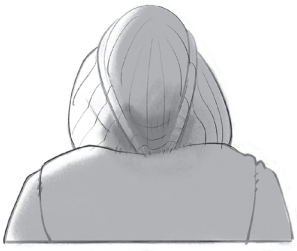
Fig. 4

Fig. 4: in this rear view, the rotation of the head creates the movement of the thread of a screw.

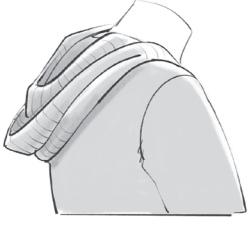


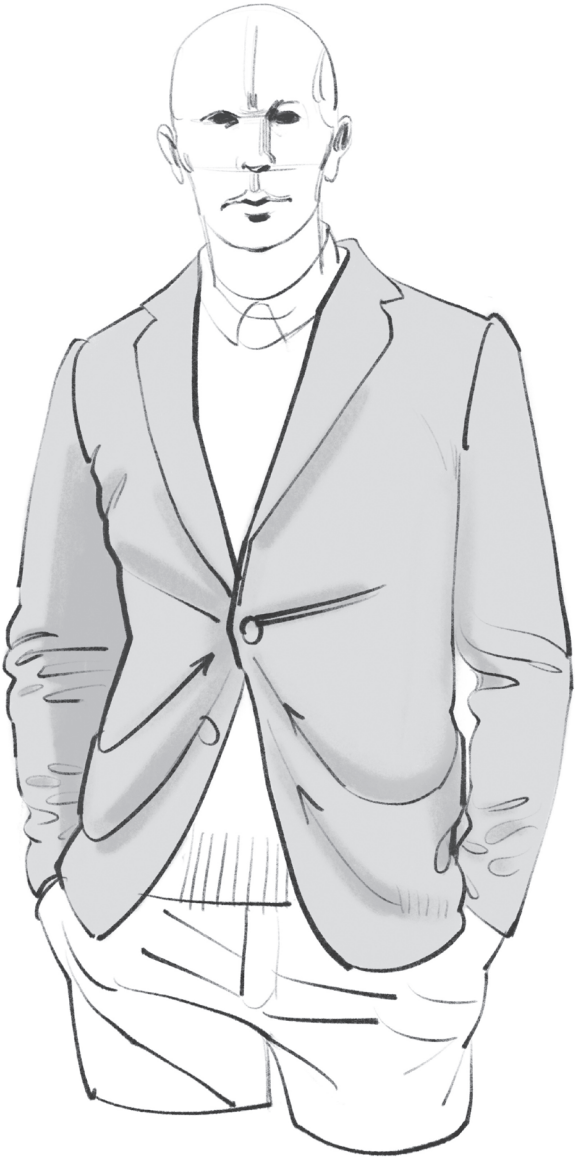
Here, again, try to imagine the three-dimensional path followed by these ribbons of fabric, in other words, scarves.



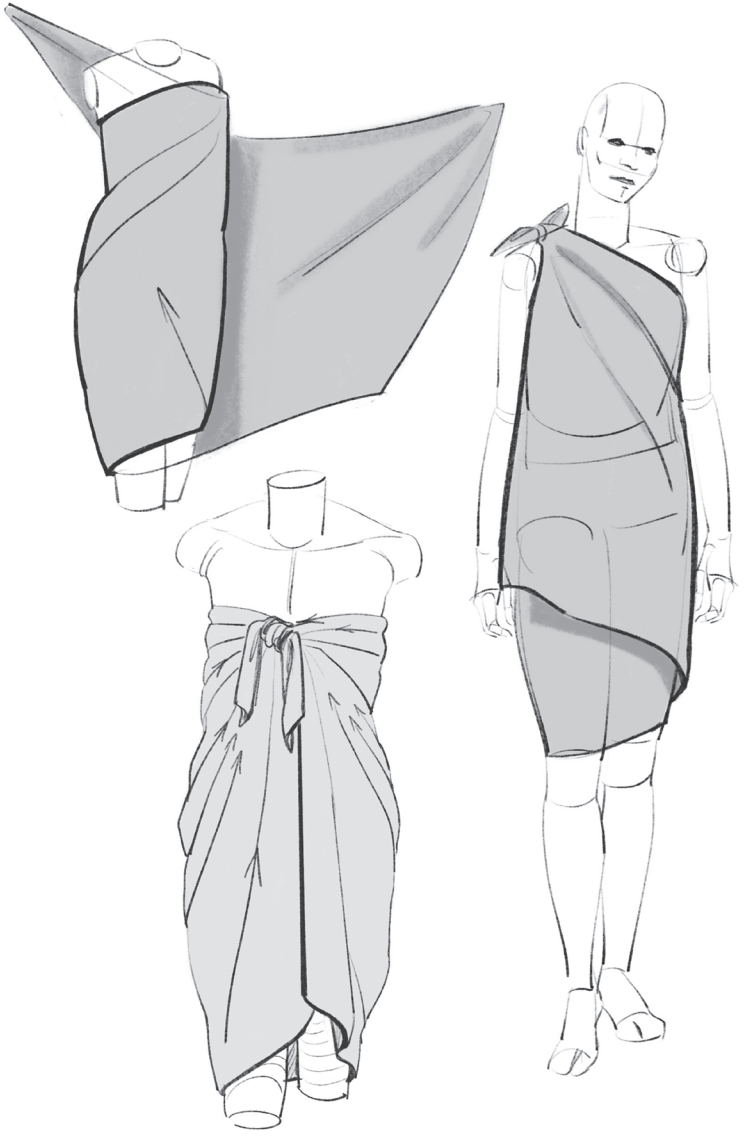


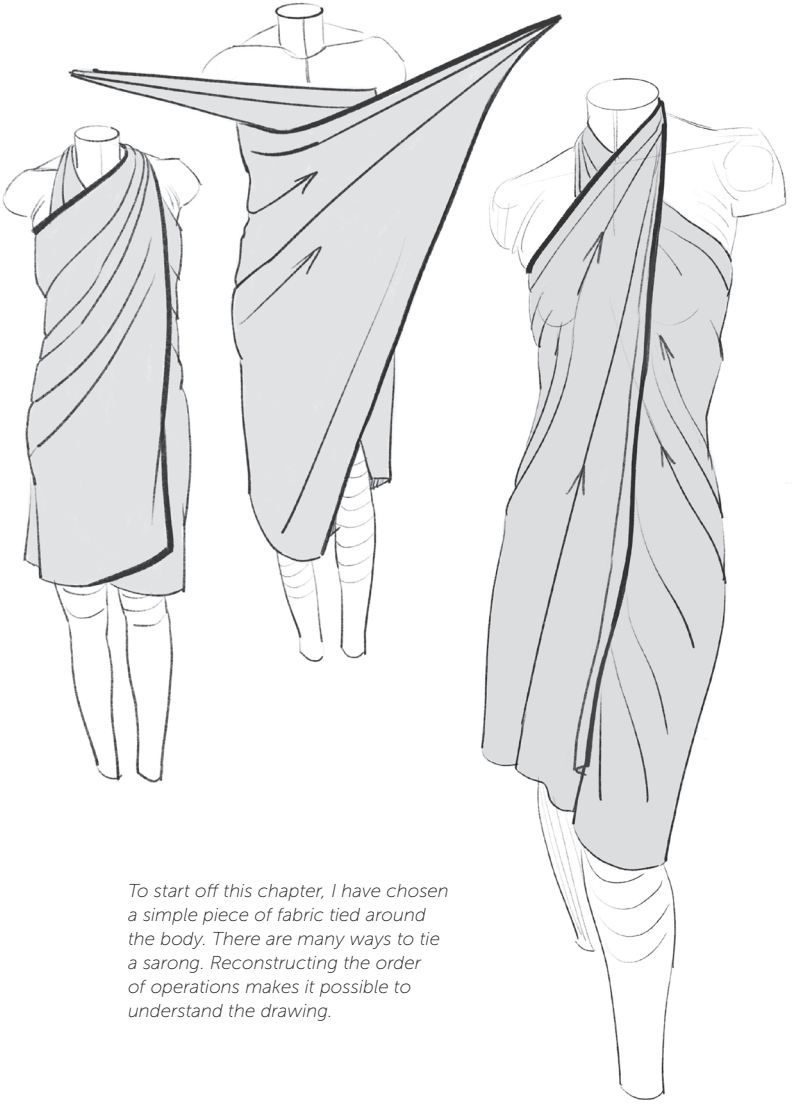
The hood can be seen as just a simple pocket.



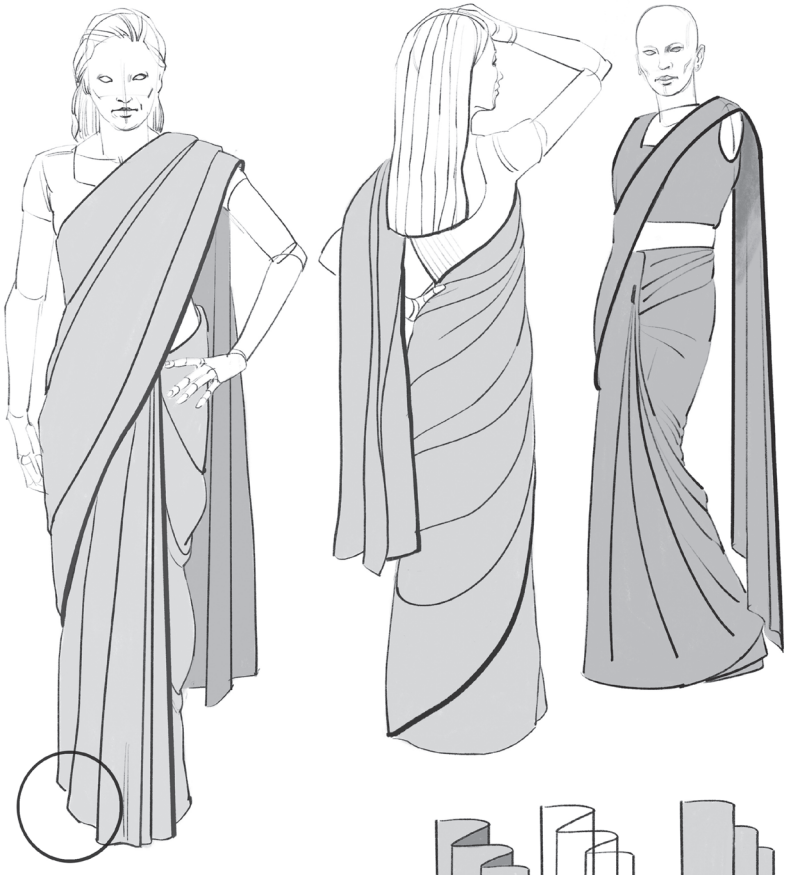


torso

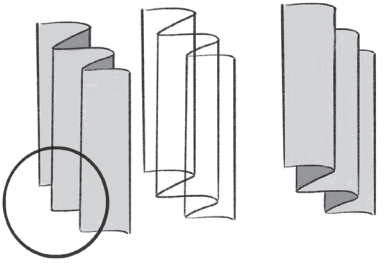


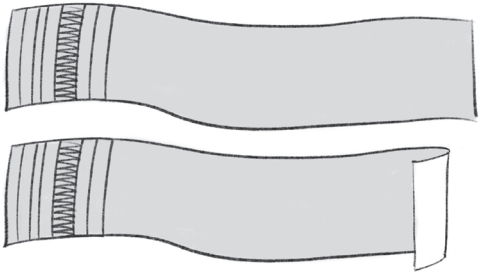


To start off this chapter, I have chosen a simple piece of fabric tied around the body. There are many ways to tie a sarong. Reconstructing the order of operations makes it possible to understand the drawing.

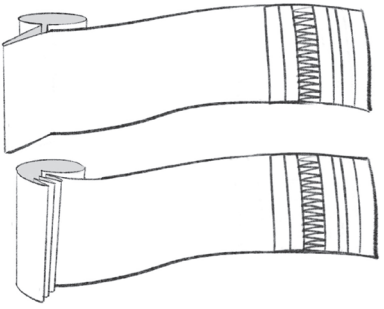


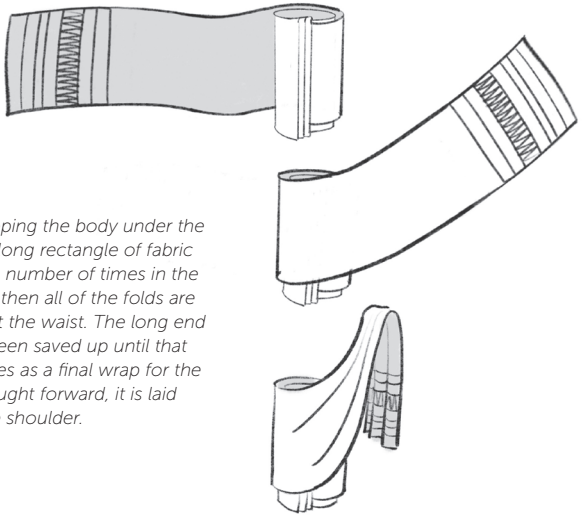
The lower edge of certain wide, flowing garments—skirts, robes, saris, etc.—takes the same shape as the lower edge of a curtain. It can be easier to first draw the wavy line that connects the visible and hidden parts of the lower edge of the fabric.





There are several ways to wear a sari. I have chosen one of the simplest ones as an example, the goal here being only to bring a certain logic to our drawing.





After wrapping the body under the belly, this long rectangle of fabric is folded a number of times in the front, and then all of the folds are pinched at the waist. The long end that has been saved up until that point serves as a final wrap for the body; brought forward, it is laid across the shoulder.

Fig. 1

Fig. 2

When the arms lie along the side of the body, they have no influence on the shape of the torso.

Clothes will be closest to the body on the most voluminous parts.

From the front (fig. 1), the chest is what dominates the shape, whether we are talking about pectorals or breasts (see also page 82).

In fatter bodies, the belly is often a third tension point (see pages 54 and 55).

The fabric will fall from these protruding volumes as if suspended. With a loose garment, the folds will meet the points of the scapula (shoulder blade) in the back (fig. 2).

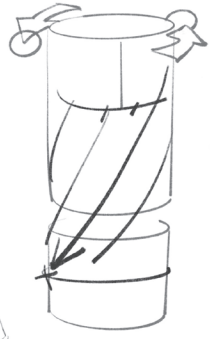
In the case of clothing that is loose and a little bit heavy, the suspension of the fabric is even more perceptible. In this front view (fig. 3), the folds drop from the points of the breasts, whereas in this rear view (fig. 4), the shape of the raincoat is marked by two long vertical folds hanging from the tips of the shoulder blades.

Fig. 3

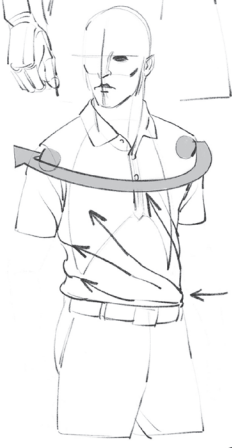
Fig. 5

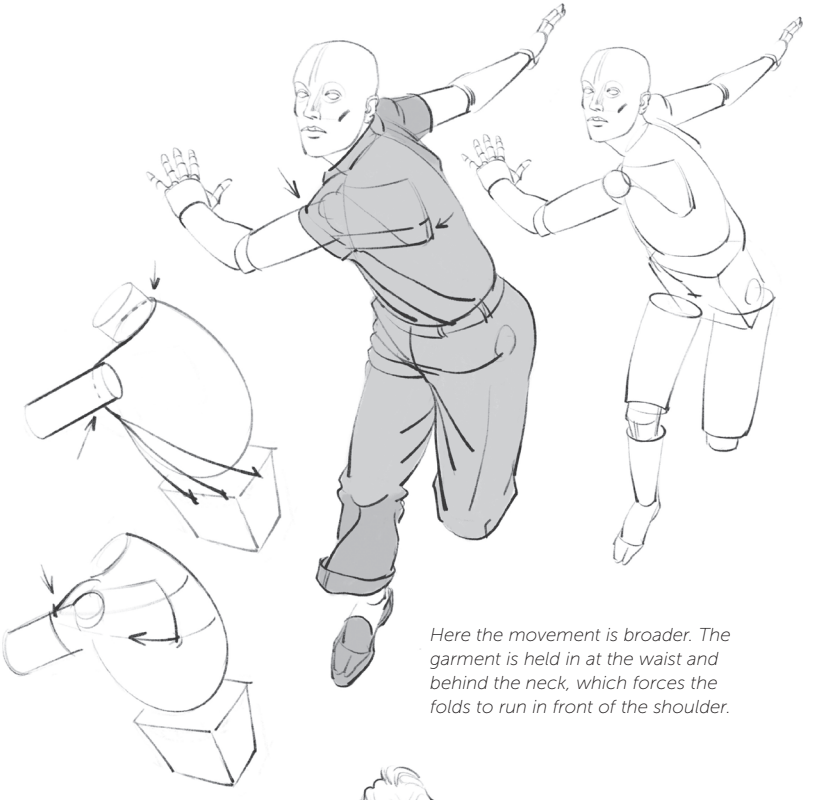
Fig. 4

Compare figures 2 and 5. In figure 5, the garment is tighter around the waist, which requires the fabric to fold and create falling folds (see introduction, page 11).



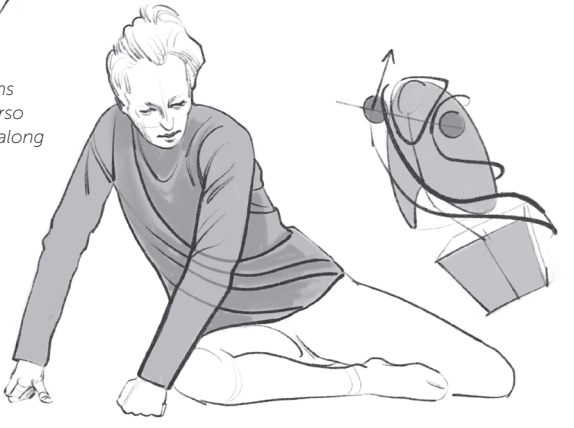
The rotation of the shoulders carries the clothing with it, which then takes the shape of a screw thread along the side, in the direction of the movement (see also page 89).





Here the movement is broader. The garment is held in at the waist and behind the neck, which forces the folds to run in front of the shoulder.

Leaning on the arms and twisting the torso carry the garment along with them.



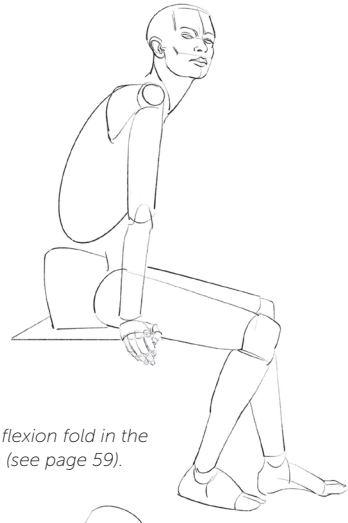
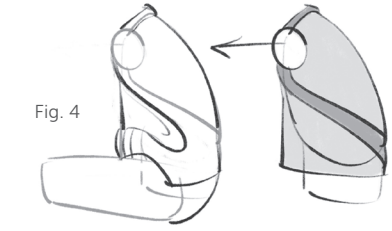


Fig. 1: flexion fold in the sleeve (see page 59).

Figs. 2, 3, and 4: carried along by the forward-leaning shoulders, the clothing is stretched taut along the rounded back.

Fig. 4



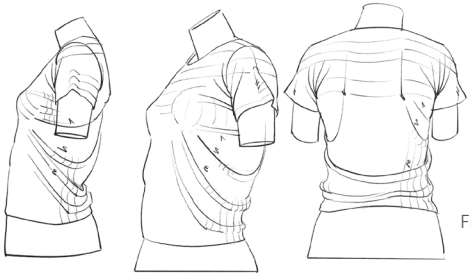
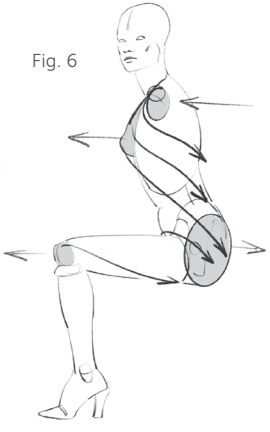
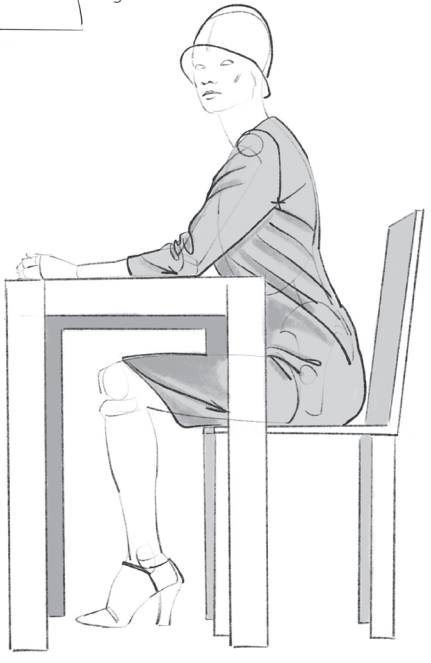


Fig. 5

Fig. 6





Figs. 5 and 6: an arched back causes the chest to stick out, which then tenses the fabric bunched up below the waist or at the buttocks in a seated position.

Fig. 1

Standing with one hip to the side throws off the symmetry of the body; on one side, the garment sits on the waist, and on the other it is pulled toward the higher shoulder.

In a back view, we can find the mirror image of the same logic. Here it is the edge of the shoulder blade (fig. 2) that determines the direction.

Note the alternation of the primary folds, which from the back view bounce off the various extruding points: shoulder blade, buttocks, knee.

Fig. 2

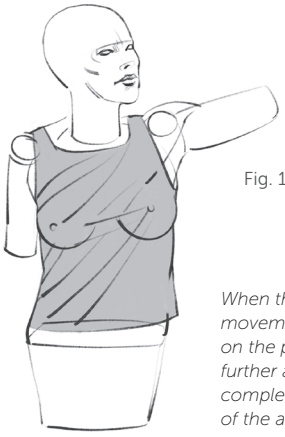
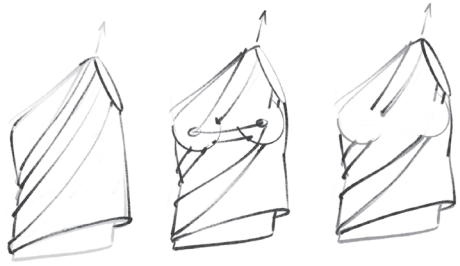
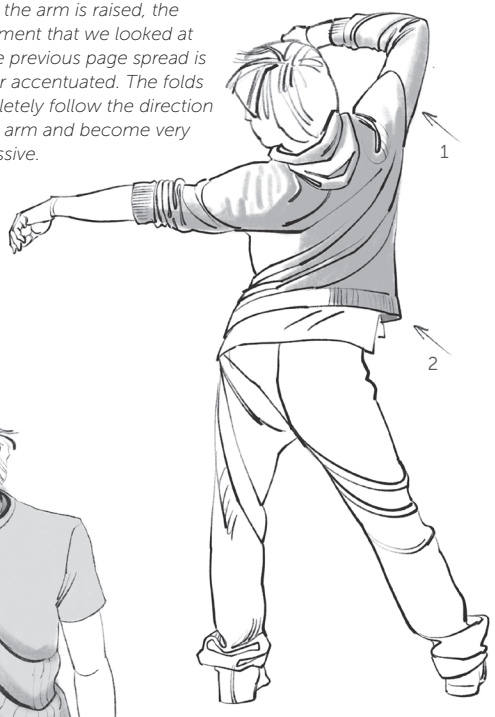


Fig. 1



When the arm is raised, the movement that we looked at on the previous page spread is further accentuated. The folds completely follow the direction of the arm and become very expressive.

Even if it is sleeveless (fig. 1), the garment will take on folds according to this tensional logic (see introduction, page 7).



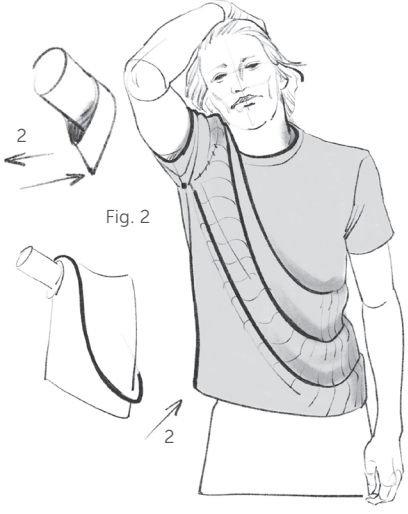
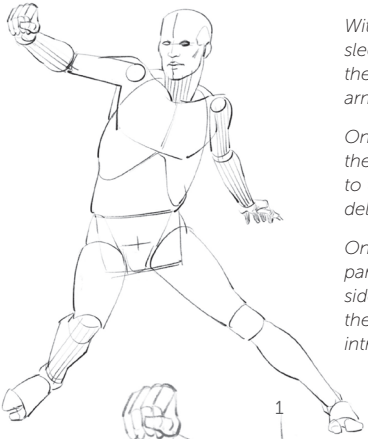


Fig. 2

Fig. 2: the seam of the sleeve thickens the fabric, and folds curl up underneath the shoulder.

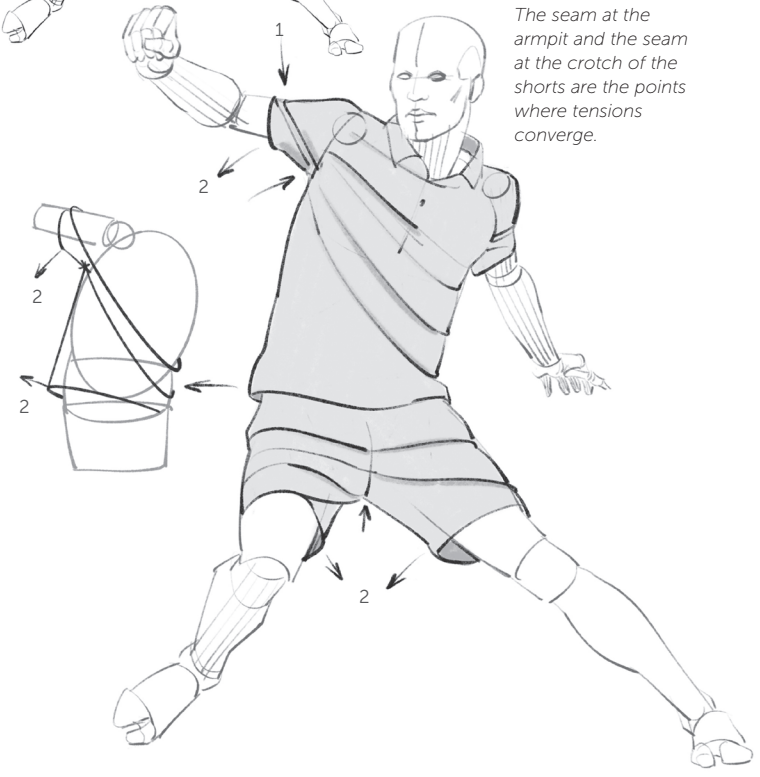


With a piece of clothing that has sleeves, the folds will always meet at the seam of the sleeve, underneath the armpit.

On this page and in the back view on the left, the folds keep going all the way to the arm, stopping at the bulk of the deltoid muscle (arrow 1).

On this page spread, note the triangular panels of fabric that start at the two sides of the armpit (arrow 2): compare them with the folds we saw in the introduction (page 7).

The seam at the armpit and the seam at the crotch of the shorts are the points where tensions converge.



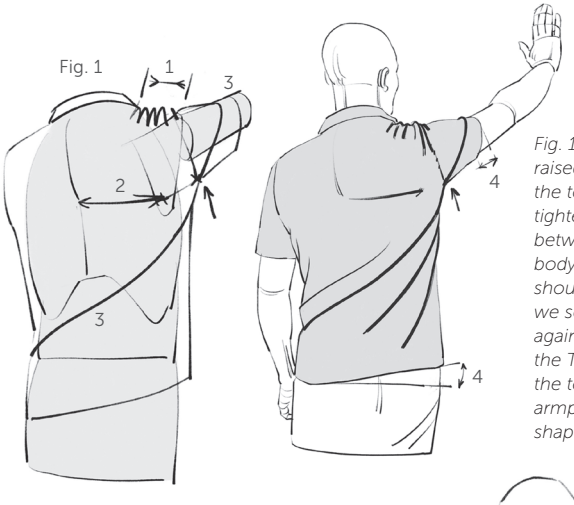
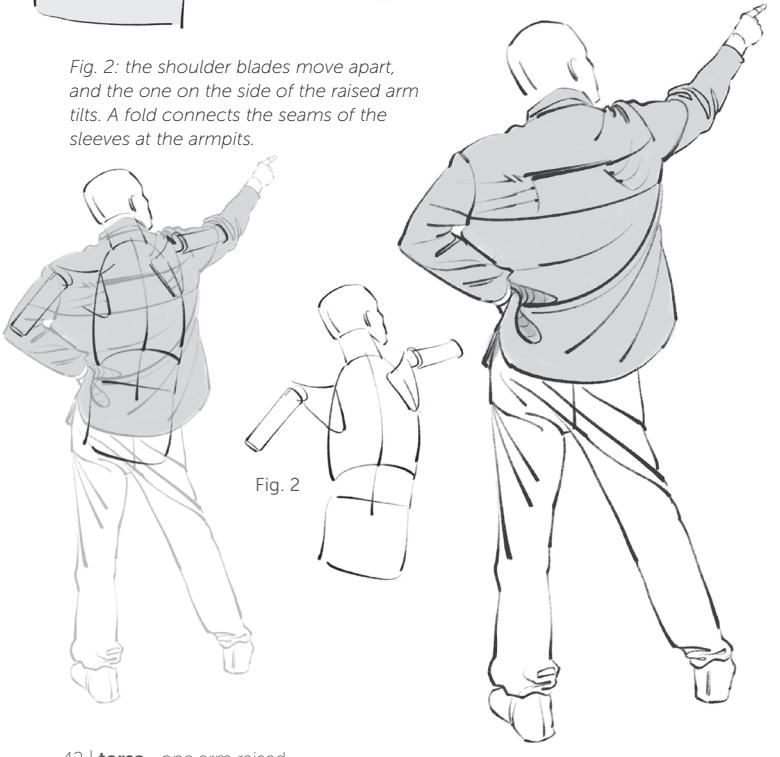


Fig. 1: when the arm is raised, the distance at the top of the shoulder tightens (1). It is increased between the axis of the body and the tip of the shoulder blade (2). Here we see the tension folds again (3). The edges of the T-shirt, pulled by the tension point at the armpit, take on an oblique shape (4).

Fig. 2: the shoulder blades move apart, and the one on the side of the raised arm tilts. A fold connects the seams of the sleeves at the armpits.



Here we see again the triangular floating panels of fabric (5). They are on the side opposite the fold that wraps around each segment of the body (X, fig. 3).

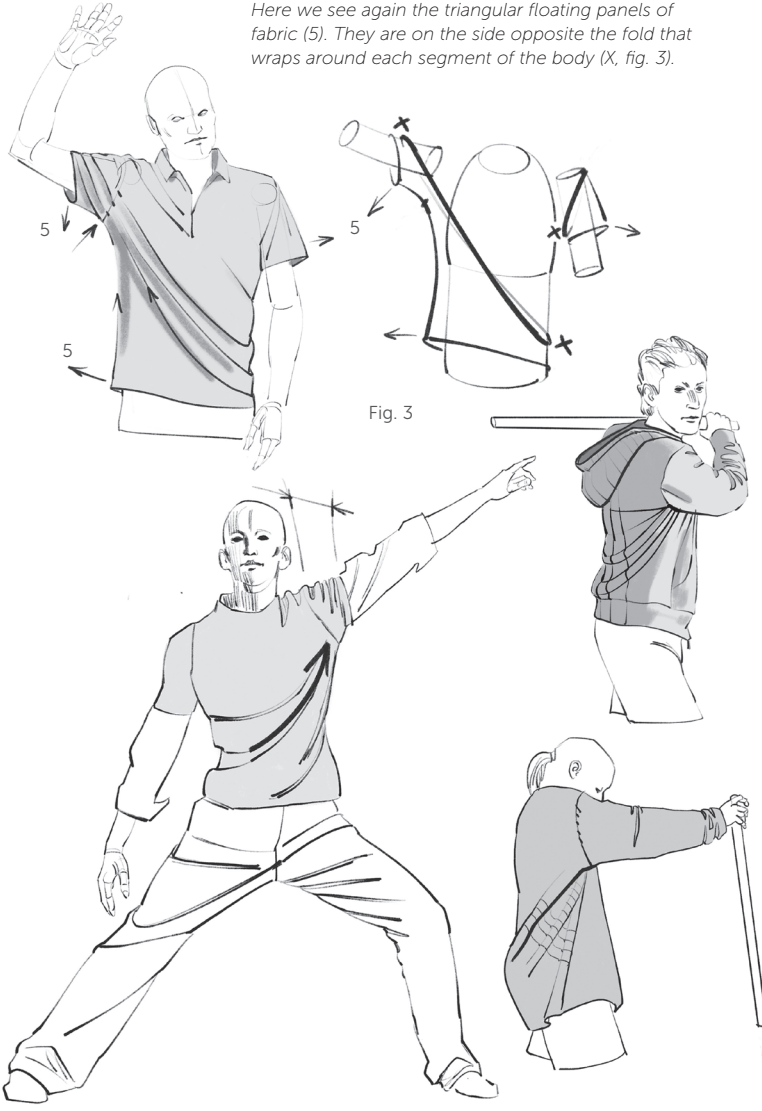


Fig. 3

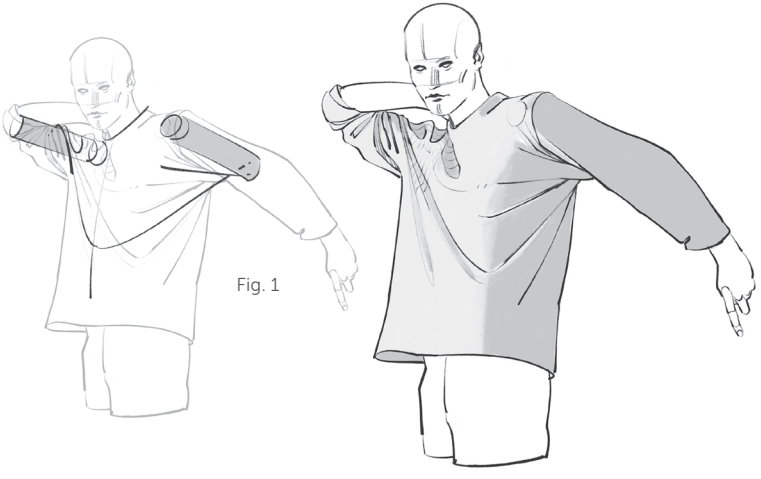
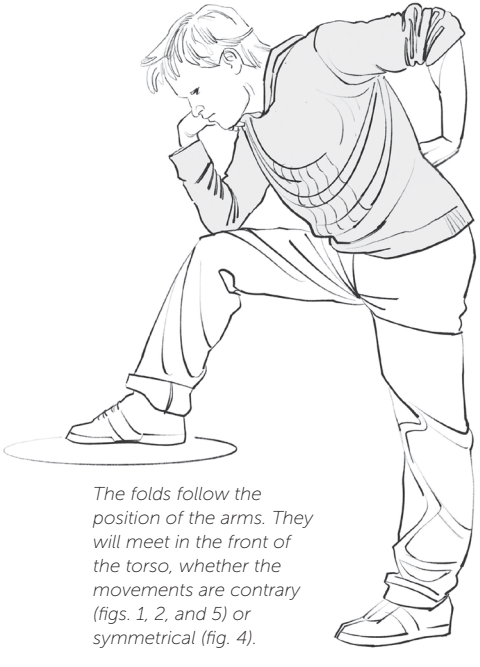


Fig. 1



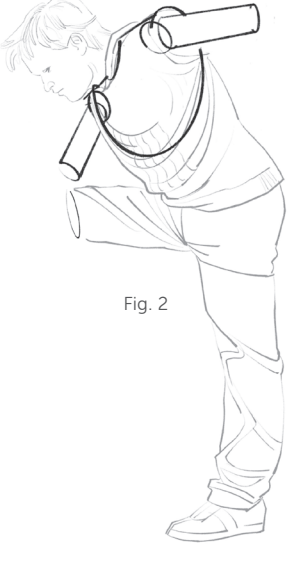


Fig. 2

The folds follow the position of the arms. They will meet in the front of the torso, whether the movements are contrary (figs. 1, 2, and 5) or symmetrical (fig. 4).

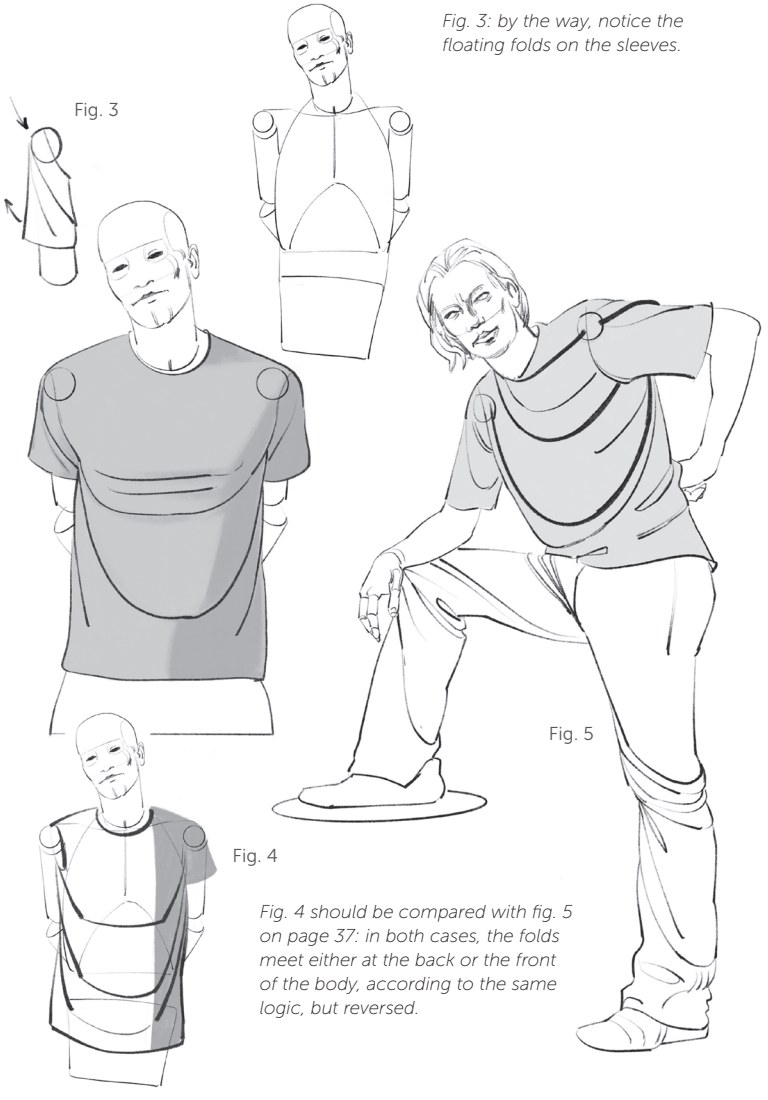


Fig. 3

Fig. 3: by the way, notice the floating folds on the sleeves.

Fig. 4

Fig. 5

Fig. 4 should be compared with fig. 5 on page 37: in both cases, the folds meet either at the back or the front of the body, according to the same logic, but reversed.

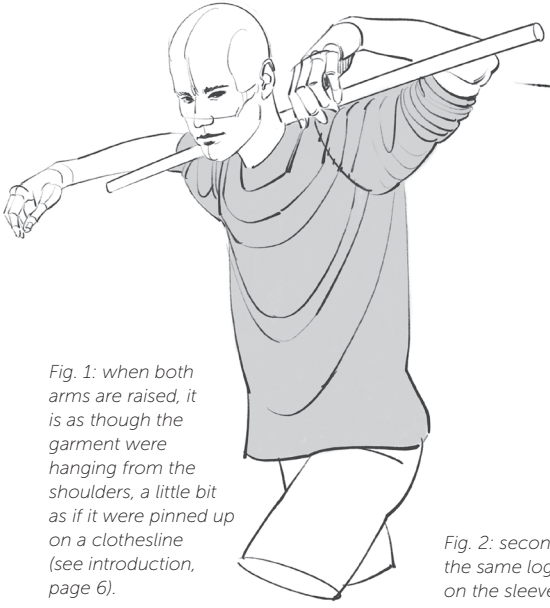


Fig. 1: when both arms are raised, it is as though the garment were hanging from the shoulders, a little bit as if it were pinned up on a clothesline (see introduction, page 6).

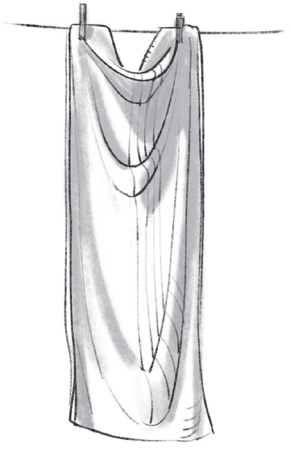


Fig. 2: secondary folds reproduce the same logic, on a different scale, on the sleeves.

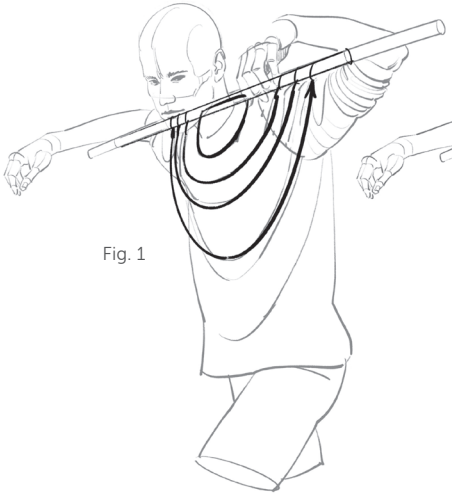


Fig. 1

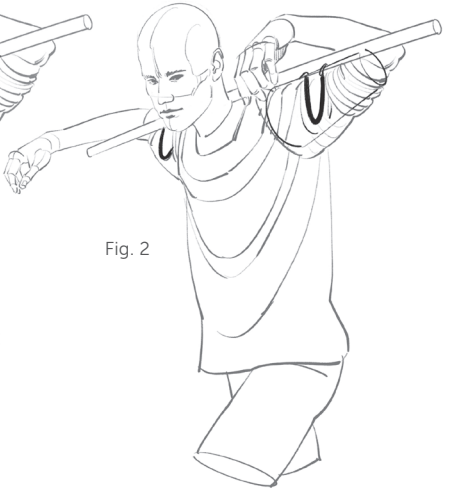


Fig. 2

Fig. 3: resting on the shoulders, the garment is suspended. Because the arms are in a symmetrical position, the folds meet in just one curve.

Fig. 3

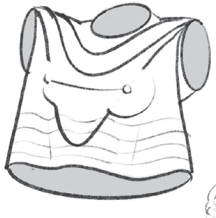


Fig. 4

Fig. 5

Figs. 4 and 5: the chest breaks this line and imposes an intermediate horizontal tension.

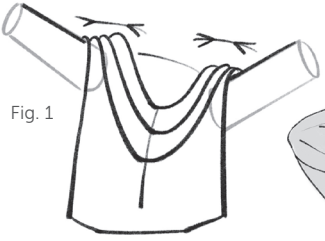


Fig. 1

Figs. 1 and 2: when the arms are raised, the distance between the shoulders and neck is reduced. The fabric then folds and bunches up at this level.

Figs. 3 and 4: at the level of the shoulders, the seams of the sleeves often make the garments stiff and force them to be raised as one block in these positions.

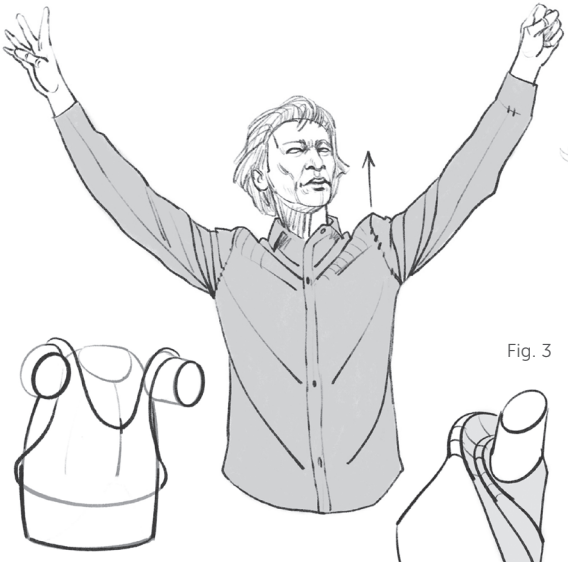


Fig. 3

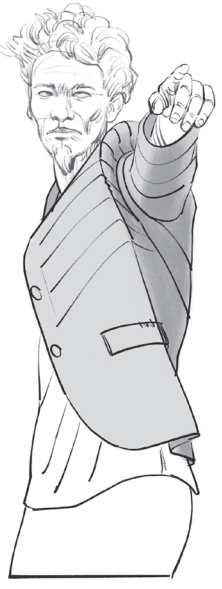
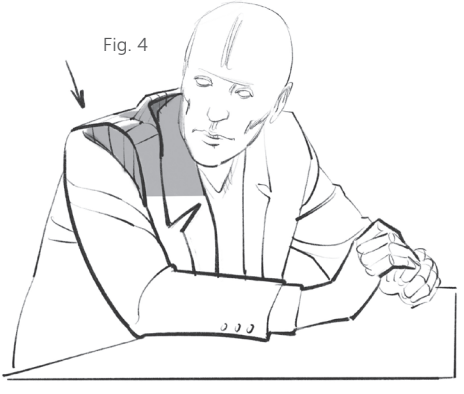


Fig. 2

Fig. 4



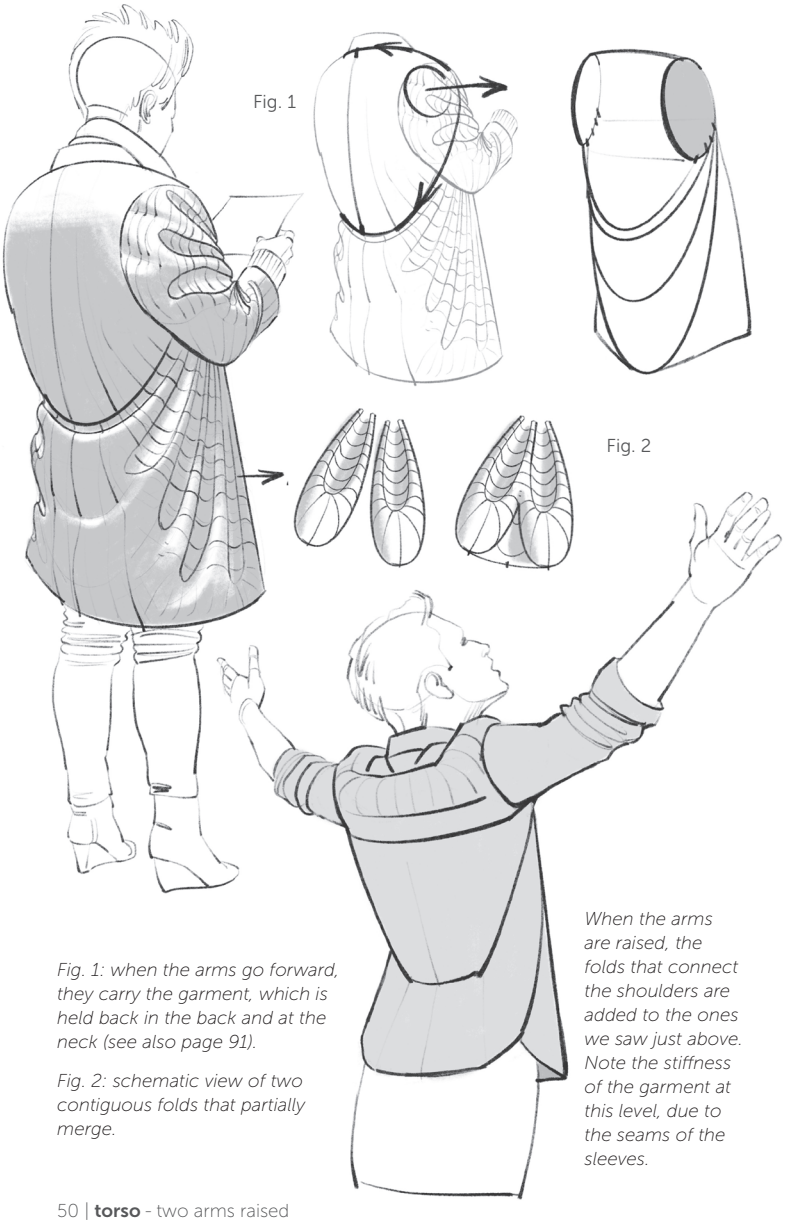


Fig. 1: when the arms go forward, they carry the garment, which is held back in the back and at the neck (see also page 91).

Fig. 2: schematic view of two contiguous folds that partially merge.

When the arms are raised, the folds that connect the shoulders are added to the ones we saw just above. Note the stiffness of the garment at this level, due to the seams of the sleeves.

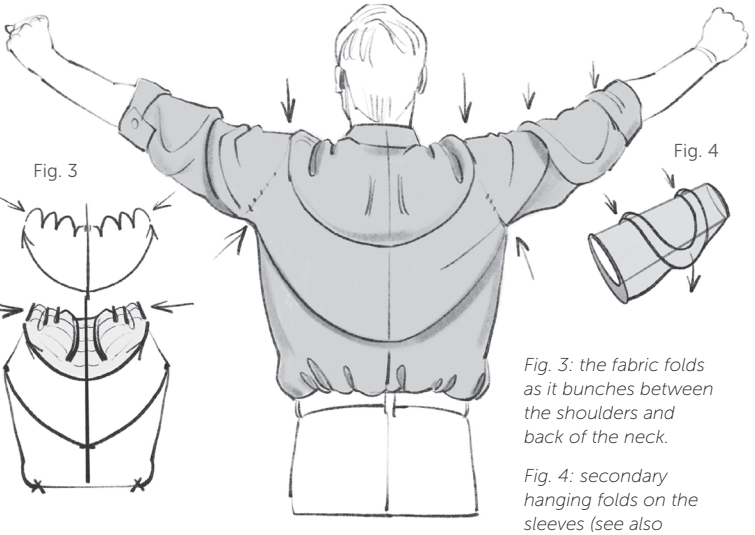
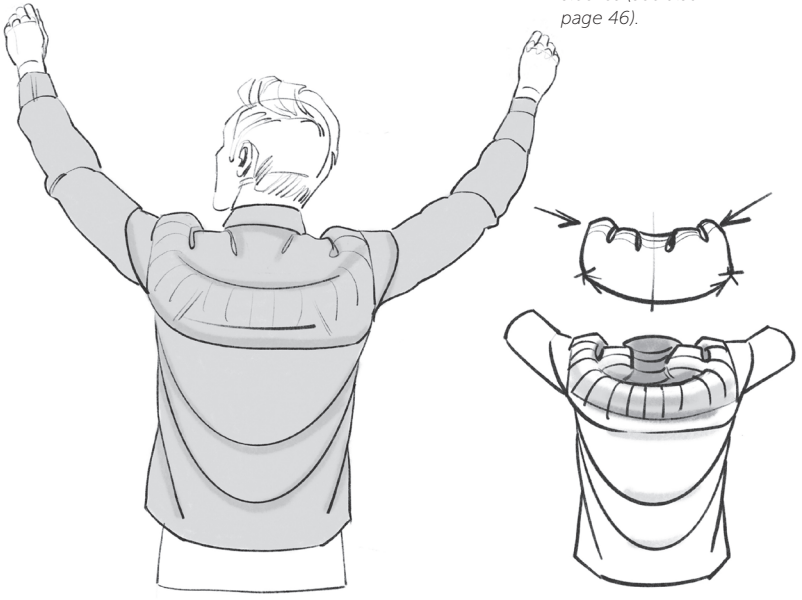
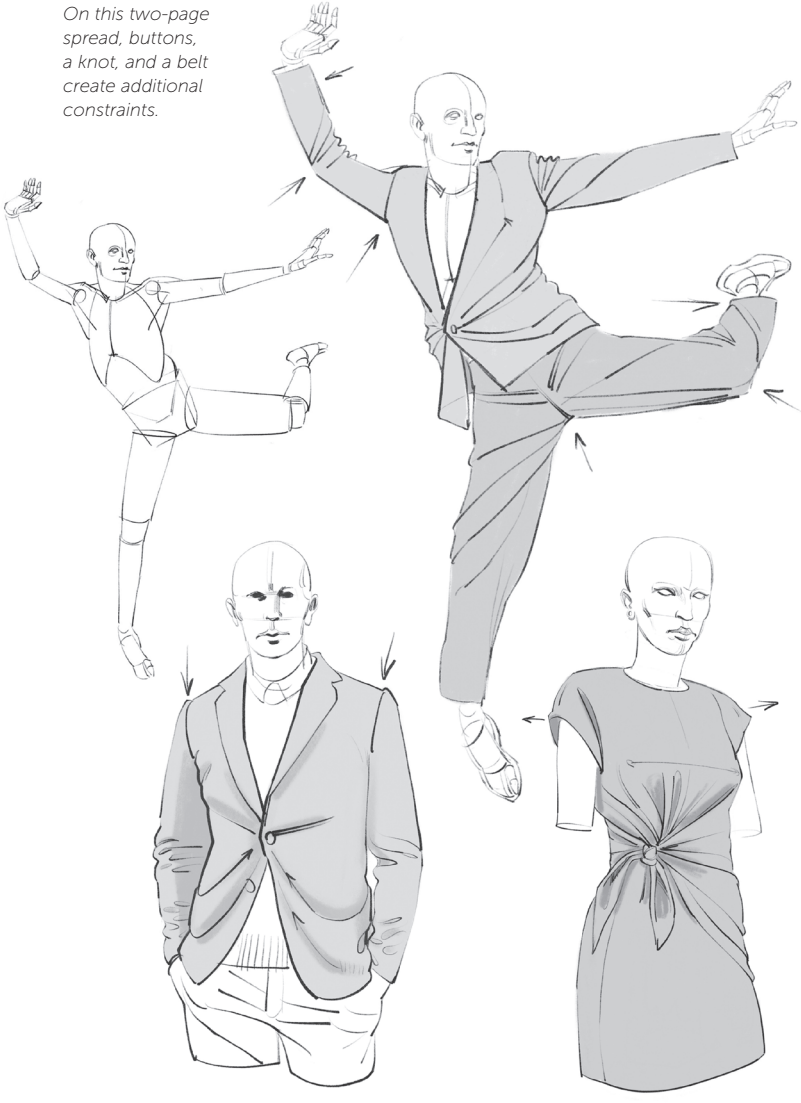


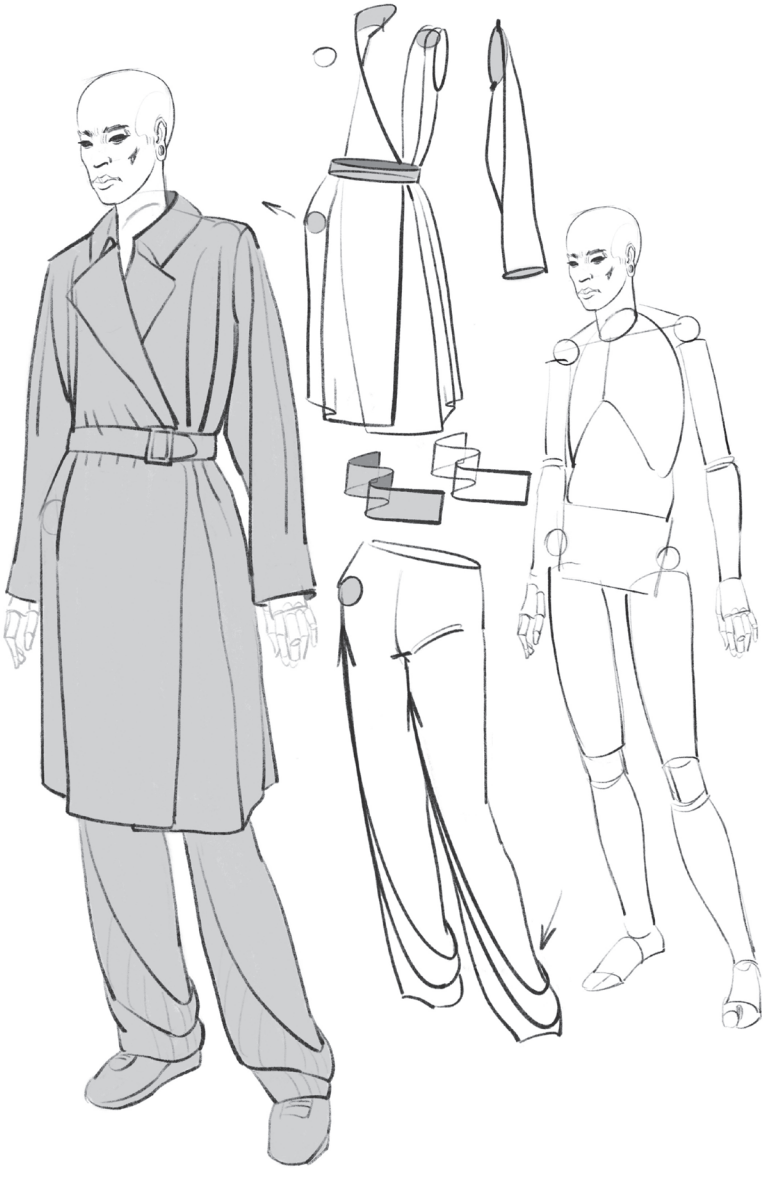
Fig. 3: the fabric folds as it bunches between the shoulders and back of the neck.

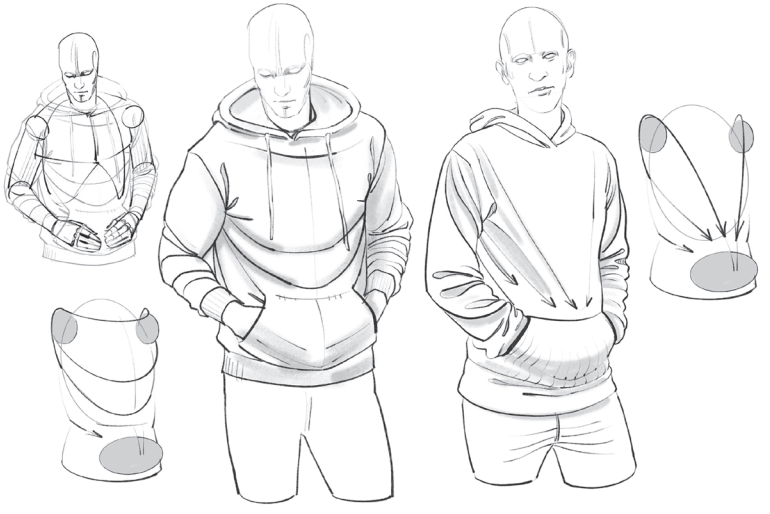
Fig. 4: secondary hanging folds on the sleeves (see also page 46).



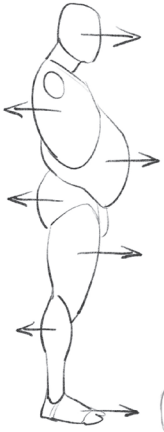
On this two-page spread, buttons, a knot, and a belt create additional constraints.







Here, the hands in the pockets draw the fabric, held back behind the shoulders, toward them.



Extra body fat, or a pregnancy, will make the folds coming from the back of the shoulders and the buttocks converge in the area of the belly.

upper limb

The natural position for the hand is in pronation (here we see it from the back, with the thumb turned in). This position implies a rotation of the radius: the bones of the forearm are crossed (fig. 1).

This coiling has repercussions for the shape of the sleeve, whose folds correspond to the anatomical logic.

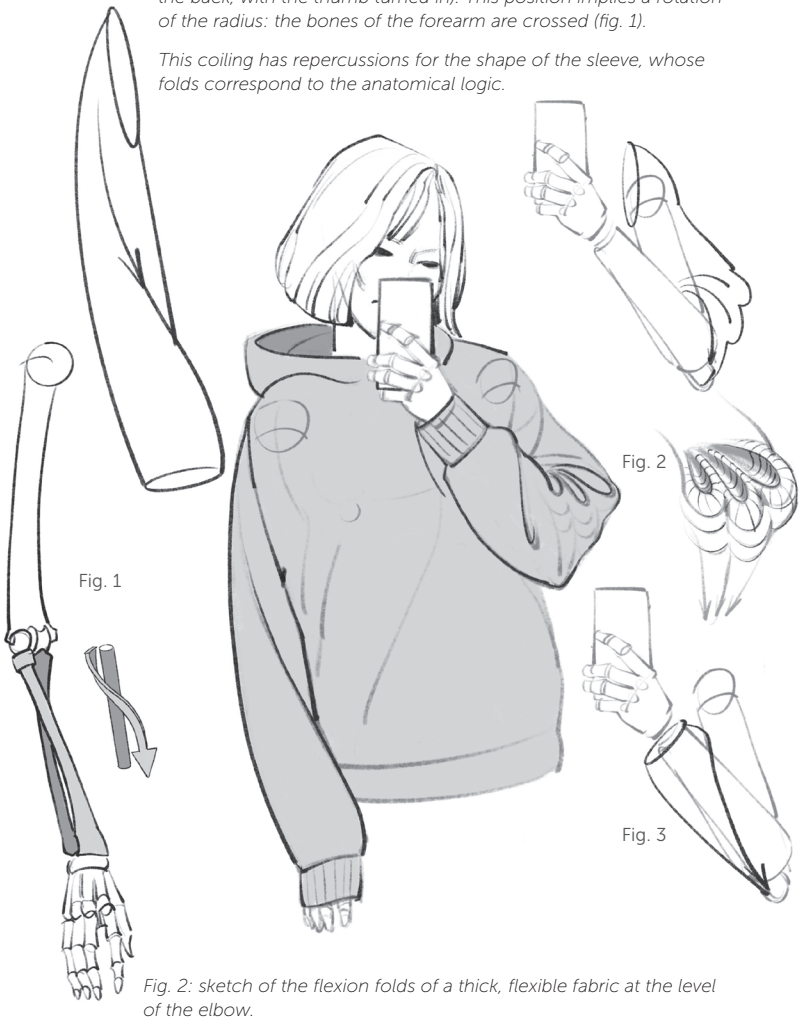


Fig. 2: sketch of the flexion folds of a thick, flexible fabric at the level of the elbow.

Fig. 3: in flexion, a fold envelops the forearm, from the elbow to the wrist, still following the same logic (see introduction, page 9).

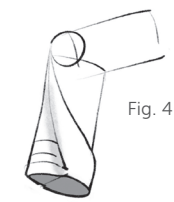


Fig. 4

Fig. 4: when the arms swing free, they form a right angle to the axis of the shoulders. Thus, it is normal here to draw the panel of triangular fabric that we always find in flexion (see introduction page 9).

Fig. 5

Fig. 5: here, the sleeve, which is, long, loose, and flexible, is subject to gravity. Alternating falling folds (right-left/up-down) form at the wrist. Of course, this simplified logic can be broken by random folds, but this primary tendency still remains, and can be seen most strongly in soft, flexible fabrics.

(See also the other diagram in the introduction, on page 11.)

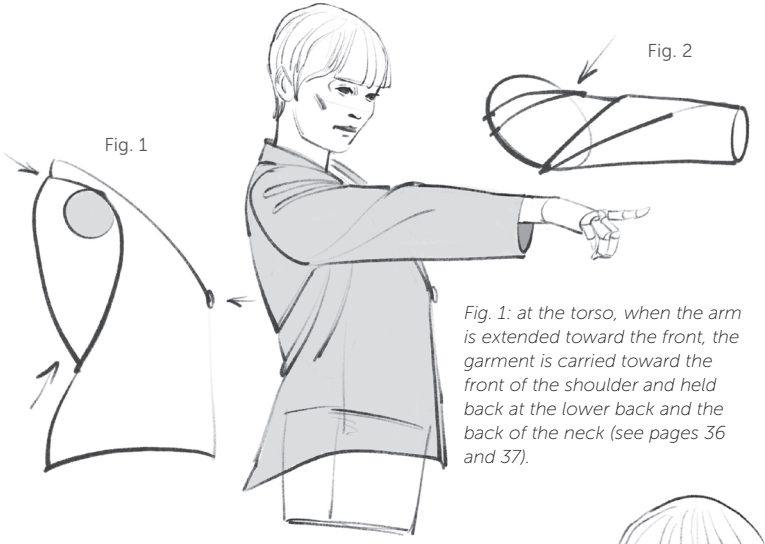
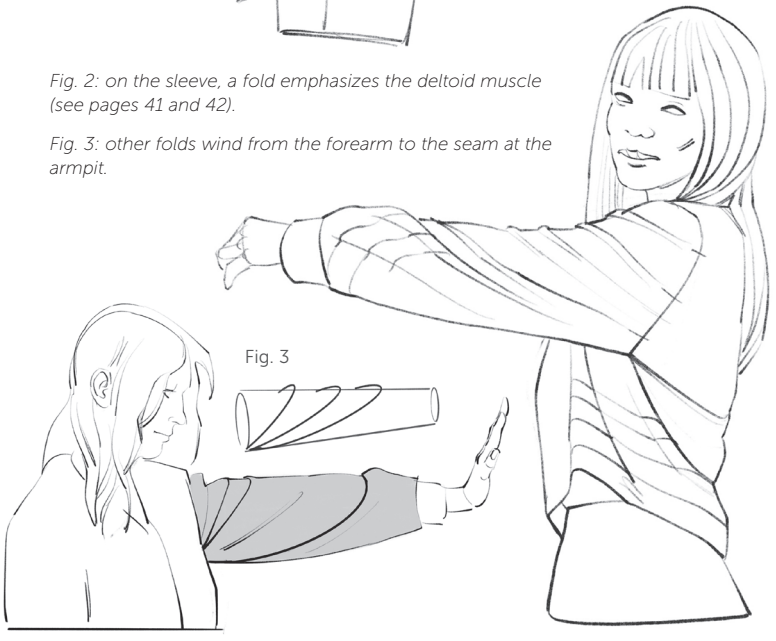


Fig. 1: at the torso, when the arm is extended toward the front, the garment is carried toward the front of the shoulder and held back at the lower back and the back of the neck (see pages 36 and 37).

Fig. 2: on the sleeve, a fold emphasizes the deltoid muscle (see pages 41 and 42).

Fig. 3: other folds wind from the forearm to the seam at the armpit.



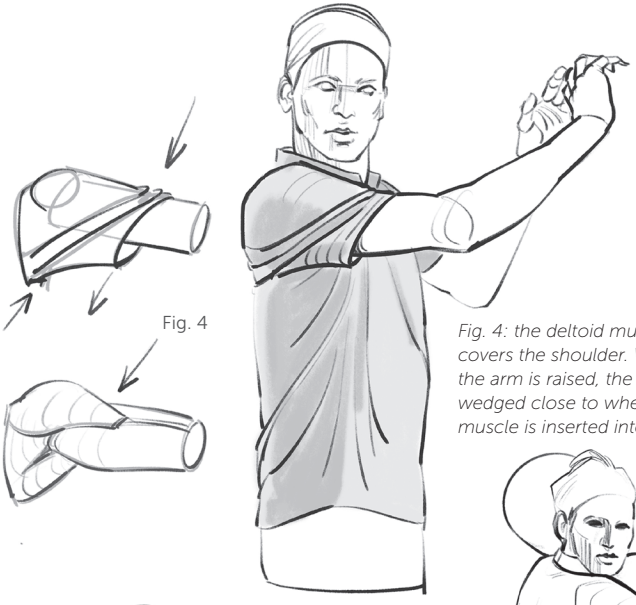


Fig. 4

Fig. 4: the deltoid muscle covers the shoulder. When the arm is raised, the fabric is wedged close to where the muscle is inserted into the arm.

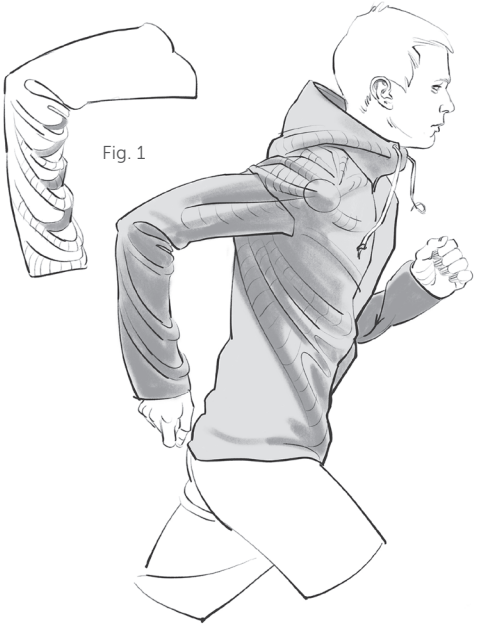


Fig. 1

Fig. 1: falling folds are added to the flexion folds (see introduction, pages 12 and 13, figs. 7 and 8).

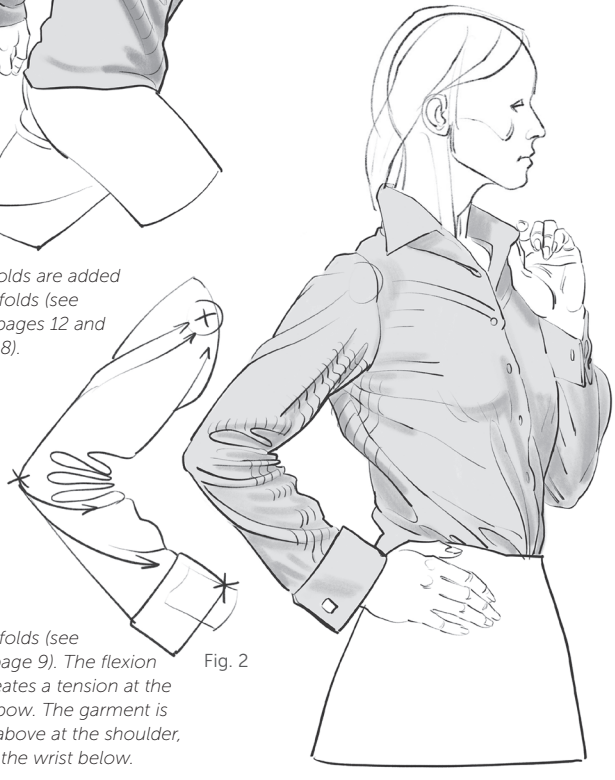


Fig. 2

Fig. 2: flexion folds (see introduction page 9). The flexion of the arm creates a tension at the level of the elbow. The garment is held in place above at the shoulder, and pulled by the wrist below.

Fig. 3: rolling folds underneath the deltoid muscle and flexion folds starting at the elbow.

Figs. 4 and 5: when the arms are held in front of the body, the constraints exerted on the torso play out on the sleeve, at the level of the shoulder.

Fig. 3

Fig. 4

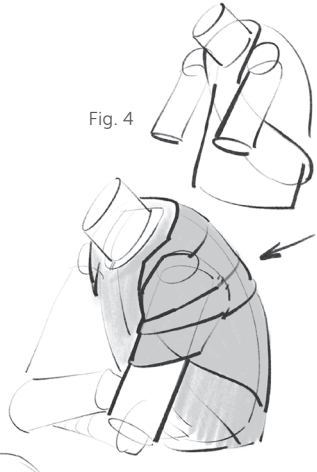


Fig. 5

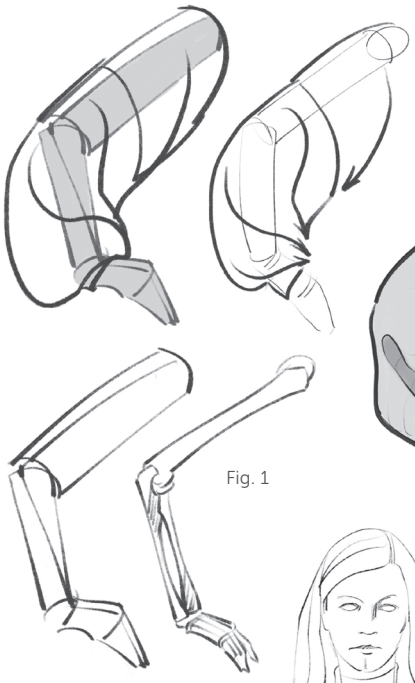


Fig. 1

Fig. 1: the sleeve follows the orientation of the hand. The folds wind from the elbow to the wrist, in the direction of the thumb.

Fig. 2

Fig. 2: folds in a helix-shaped series from the waist to the armpit and then reaching to the forearm.

Two versions of the same drawing. The top one (fig. 3) shows the direction of the primary folds. In the lower one (fig. 4), the thickness of the fabric is taken into account.

Fig. 3

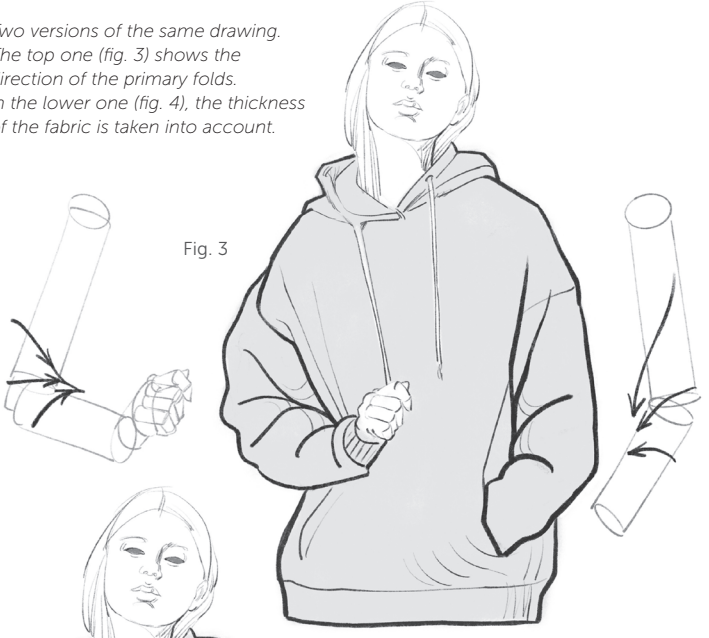


Fig. 4

Figs. 1 and 2: still following the same logic (see introduction, page 9), the flexion folds point toward the tip of the elbow and then wind toward the wrist on one side; on the other, they are held back at the armpit seam.

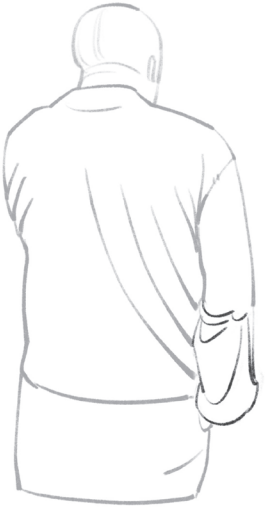
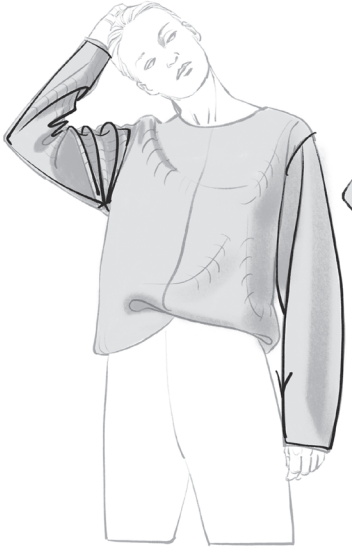


Fig. 1

Fig. 2



We saw, earlier, that the movements of the arm will change how we draw the torso, since the sleeves are most often seamed at the shoulders. This is even more true for extremely loose clothing. On the right-hand page, it is as though the garment were just laid over the arm or hung from the tip of the elbow.

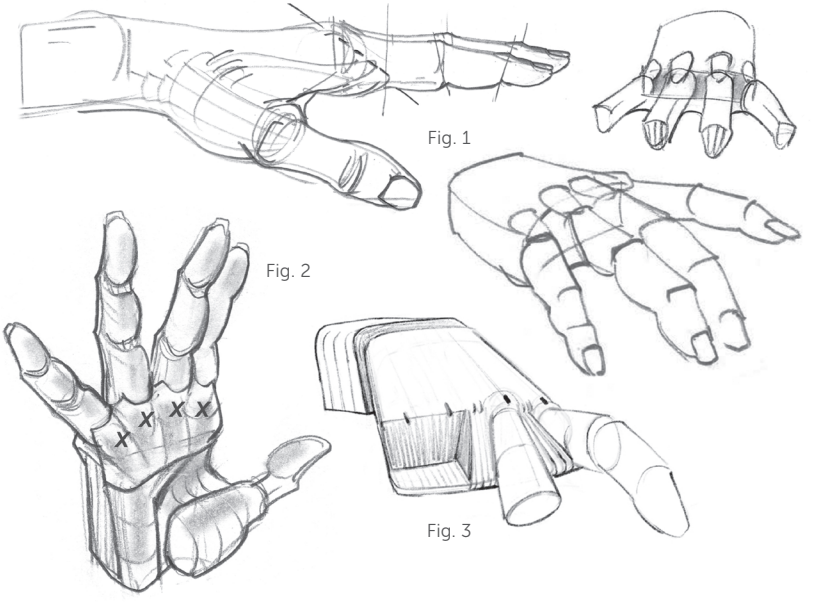
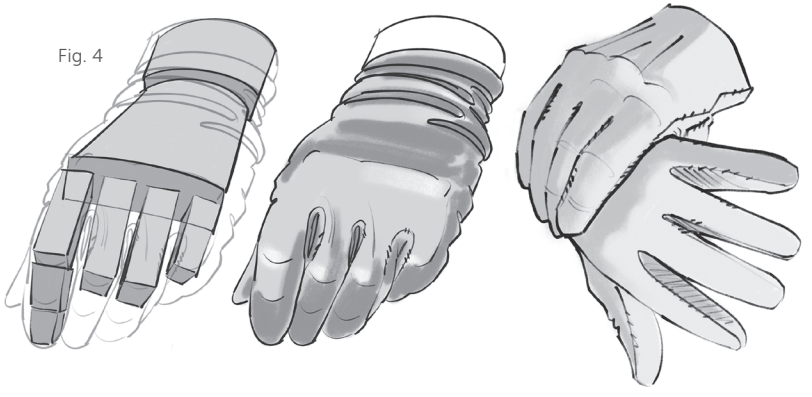


Fig. 1: the heads of the metacarpals (the fist) are protected, on the palm, by a fatty padding that creates an offset in the contours, when seen from the side. This is responsible for the folds of skin, or "palms," between the fingers.

Fig. 2: the heads of the metacarpals are indicated by crosses.

Figs. 3 and 6: these "palms" overlap the first phalanges by half their length, making the fingers look shorter when seen from above.



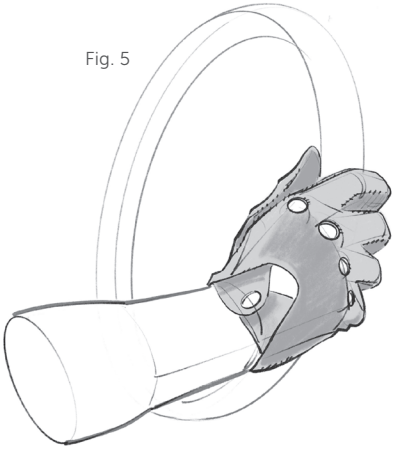


Fig. 5

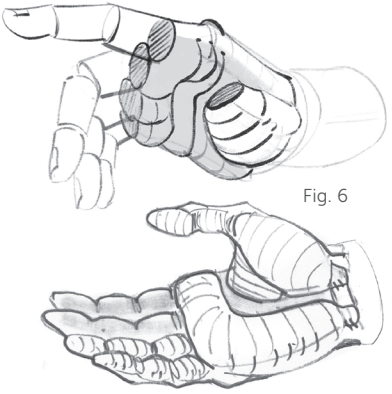


Fig. 6

Figs. 4 and 7: this offset makes it necessary to "cut off" the fingers above the joints of the fist.

Fig. 5: these driving gloves have openings at the heads of the metacarpals, which reshapes the hand, emphasizing its bone structure.

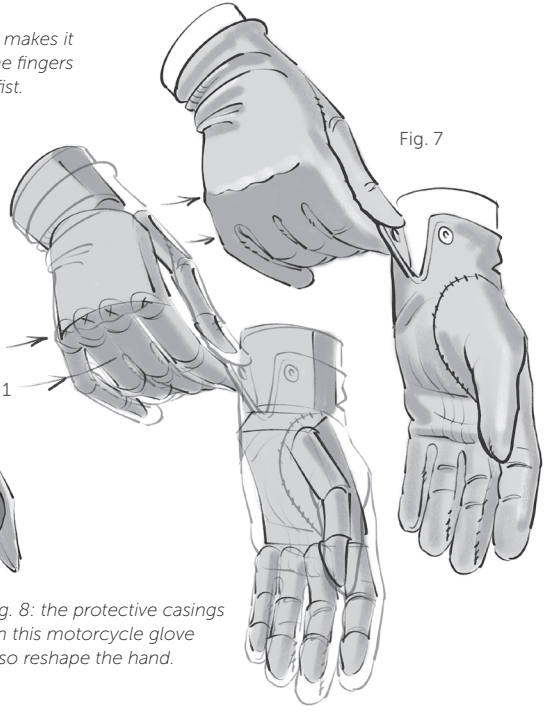


Fig. 7

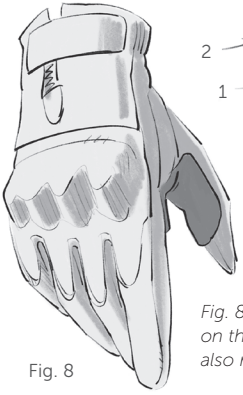


Fig. 8

Fig. 8: the protective casings on this motorcycle glove also reshape the hand.

lower limb

Fig. 1: in a standing position, with the feet together, from the side, the various segments of the body alternate leaning to the left and the right of a plumb line that runs from the center of the head to the top of the plantar arch.

Fig. 2: the knee and the ankle are behind this plumb line. Held forward at the front of the pelvis, fabrics then stretch under the thigh.

Fig. 3: in this position, conversely, the fabric is held back behind the pelvis and the folds, logically, form in the opposite direction.

Fig. 1

Fig. 2

Fig. 3

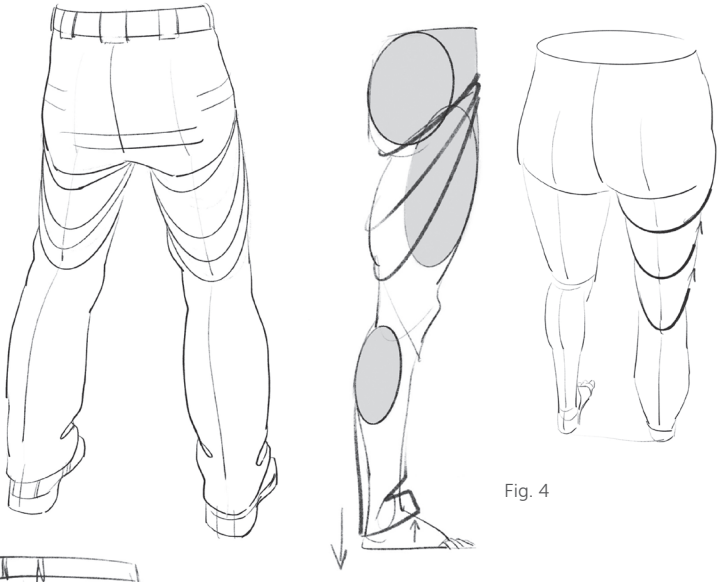


Fig. 4

Fig. 4: tilting forward, the pelvis pulls on the fabric behind the thighs. In the back, the pants are suspended at the calf; in the front, the fabric is pushed up at the top of the shoe.

Figs. 1 to 3: the calf becomes a point of convergence for the tension folds when it is bulky (fig. 1) or when the leg is offset toward the rear (fig. 2), but also when there is ligamentary laxity at the level of the knees (fig. 3).

Fig. 1

In such cases, the calf pulls on the fabrics that are held in front, above, at the pelvis. Whereas below, under the knee, the tensions run in the reverse direction to join at the front of the leg.

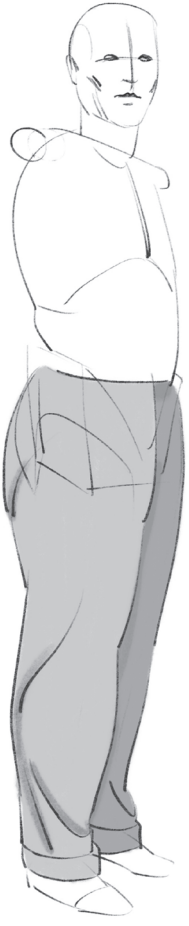


Fig. 2

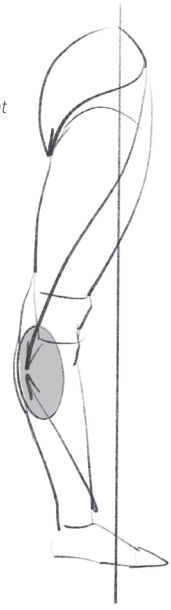


Fig. 3

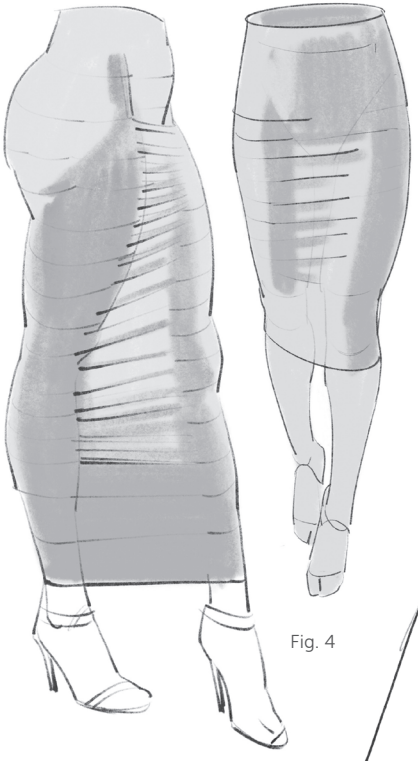


Fig. 4

Fig. 4: tight-fitting clothes create multiple series of folds that girdle the body. These two skirts stick to the contours of the thighs and the hips, and stretch between the thighs (see introduction page 10).

Fig. 5

Fig. 5: on wider skirts, the tension folds follow the various postures (here, a standing position with one hip thrown out) more than they do the body shapes themselves.

Fig. 1

In a standing position with one hip tilted, the folds are no longer symmetrically mirrored. They run in the same direction on both legs.

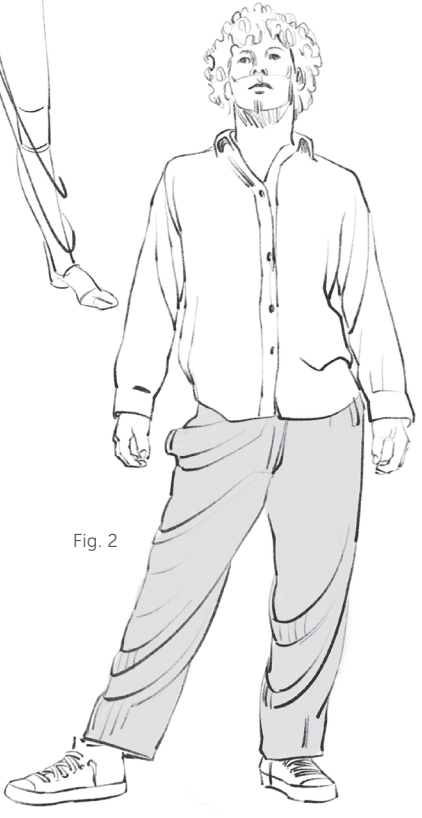


Fig. 2

Figs. 1 and 2: the pelvis tilts and the garment hangs, on one side, from the higher hip, and on the other side, from the seam of the crotch.

Fig. 3

On this page, the folds continue beyond the crotch. The hands in the pockets emphasize and amplify the movement (fig. 3).

Fig. 4

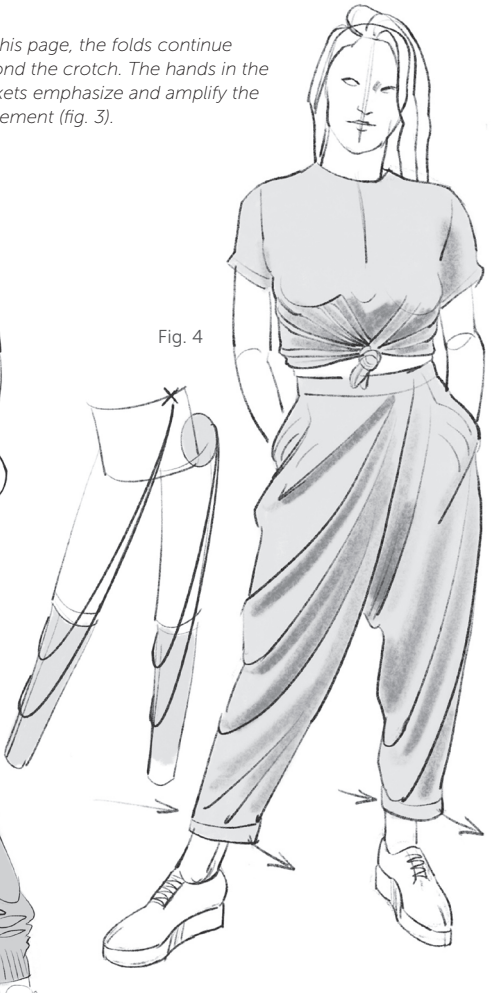


Fig. 4: here, it is the pattern of the garment itself that explains why the fold does not stop at the crotch but instead continues all the way to the belt.

Fig. 1

Fig. 1: when one hip is tilted to the side, the pelvis tilts and the hip joint becomes the point of tension.

Figs. 1 and 2: on the side of the relaxed leg, the folds connect with the seam at the axis of the buttocks (see arrows);

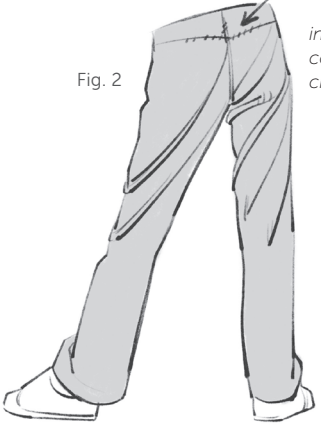


Fig. 2

instead of simply connecting with the crotch (fig. 3).

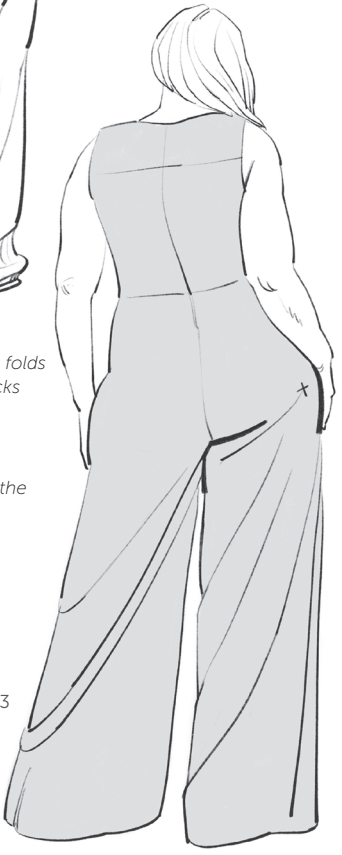


Fig. 3

Fig. 4

Fig. 4: in this walking sequence, we once again see the long folds on the side of the weight-bearing leg, alternately on the left or on the right depending on where the weight is coming down.

When the legs are apart, the folds are pulled forward by the leg in front and held back by the leg that is behind.

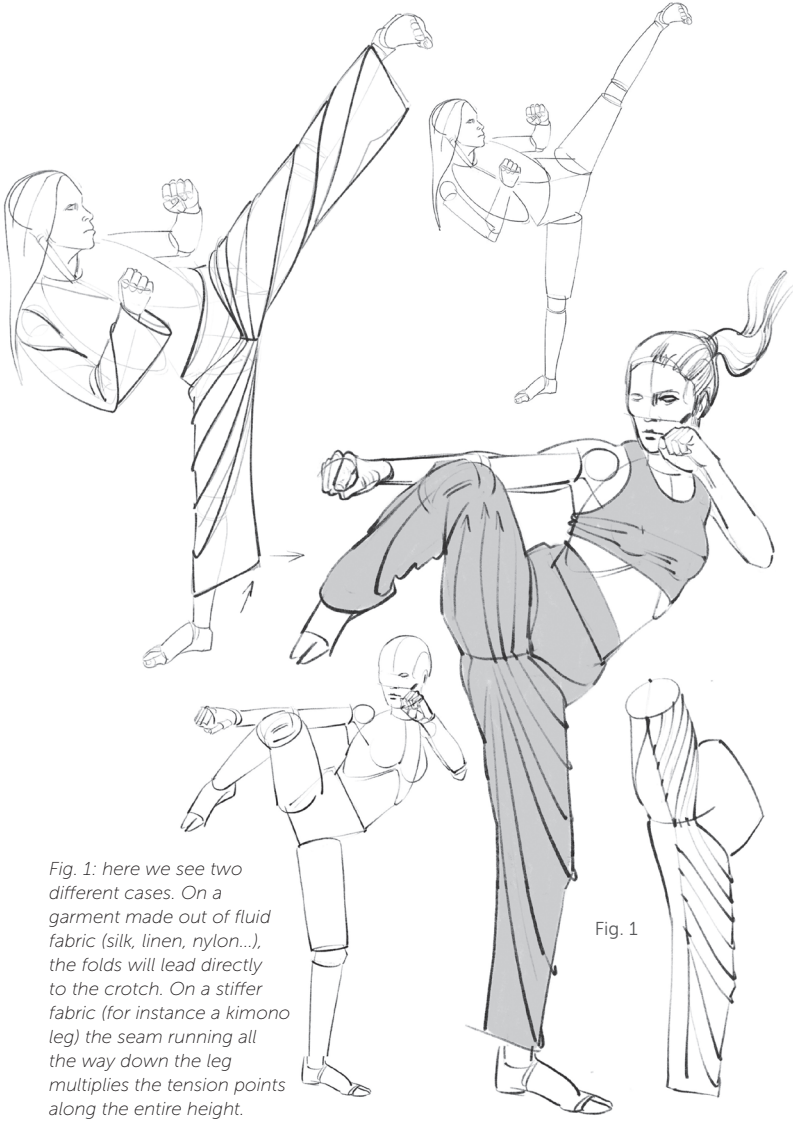


Fig. 1: here we see two different cases. On a garment made out of fluid fabric (silk, linen, nylon...), the folds will lead directly to the crotch. On a stiffer fabric (for instance a kimono leg) the seam running all the way down the leg multiplies the tension points along the entire height.

Fig. 1

Fig. 2: the logic is the same for shorts. The tensions are only relayed along the thighs.

Note the fold that runs from one hip joint to the other.

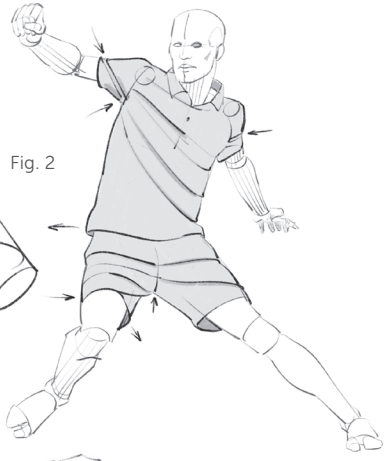


Fig. 2

Fig. 3

Fig. 3: do not lose sight of the issue of volume. The folds girdle each segment of the body, acting like rubber bands.

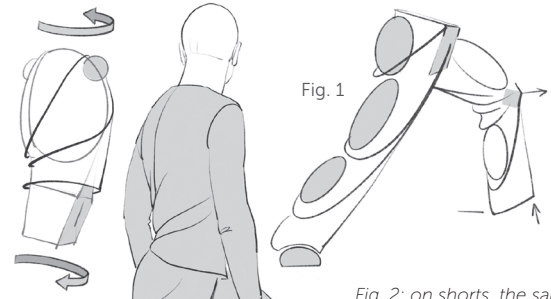


Fig. 1

When the leg is bent, the knee sticks out underneath the clothes and pulls toward itself the fabric that is held back on the inside, at the crotch seam, by the thigh (figs. 1 and 3), and on the outside by the tip of the buttocks (fig. 4).

Fig. 2: on shorts, the same logic prevails. The knee is no longer the high point, however, and the tensions are transferred to the top of the convexities of the thigh.

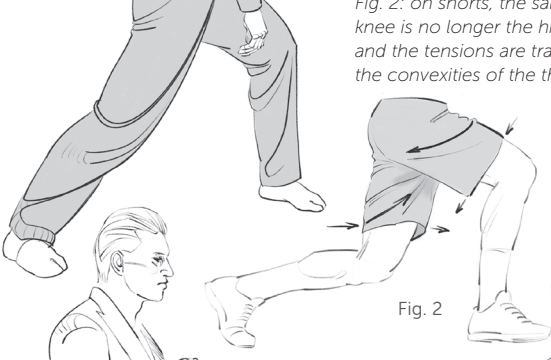


Fig. 2

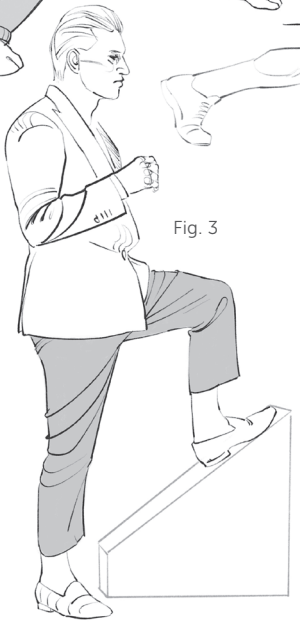
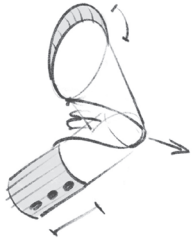


Fig. 3

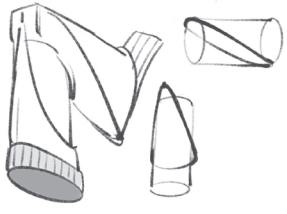
Fig. 4: note here the constraint produced by the pressure of the hand.

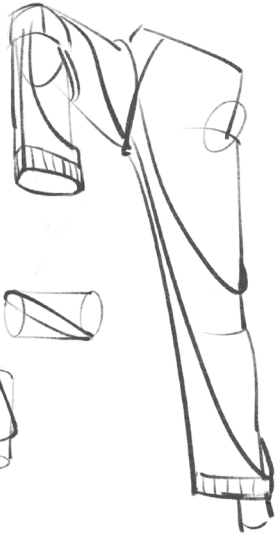
Fig. 4



On flexed limbs, whether the arms or the legs, we find the same logic and the same flexion folds (see introduction, page 9).

The tip of the knee corresponds to the tip of the elbow. The folds stretch from the seams of the crotch or of the armpit. They enclose the top of the ankle and of the wrist.





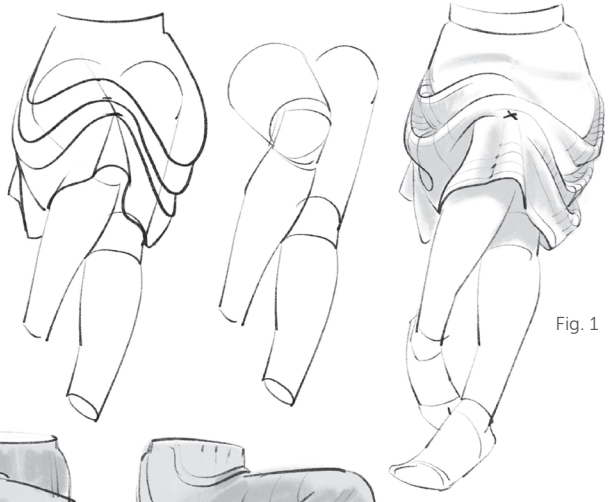


Fig. 1

Fig. 2

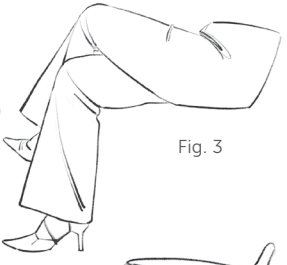


Fig. 3

Figs. 1 and 2: hanging folds (see introduction page 6) are combined here with flexion folds (see introduction page 9).

Figs. 3 and 4: for any kind of garment, the basic logic remains the same.

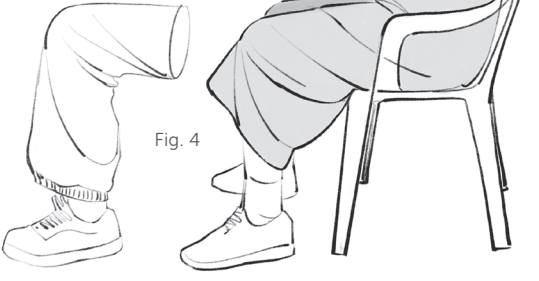


Fig. 4

Fig. 5: the folds wrap around the hip joint.

Fig. 5

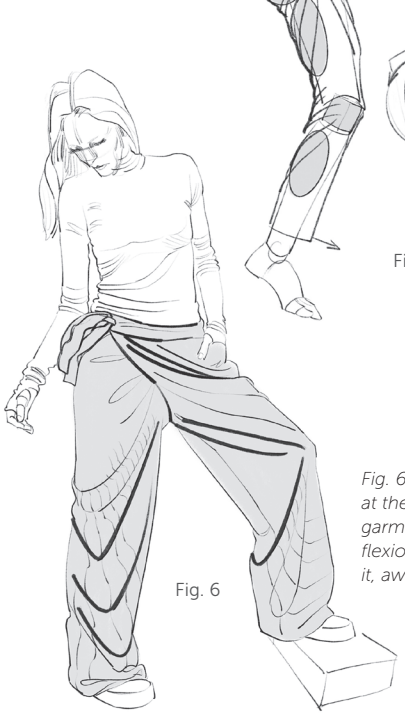


Fig. 6

Fig. 6: the knot at the waist of this garment pulls the flexion folds toward it, away from the hip.

Figs. 1 and 2: here we see again the flexion folds and the floating triangular panel of fabric (see introduction page 9).

Fig. 3: secondary folds (see introduction page 12).

Figs. 4 and 7: at the level of the hip joint, when the thigh is flexed, a flexion fold starts at the top of the buttocks and runs to the seam of the crotch.

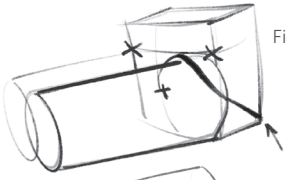
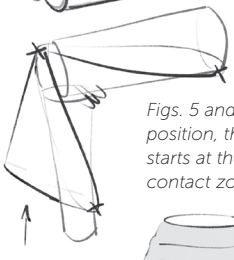


Fig. 4



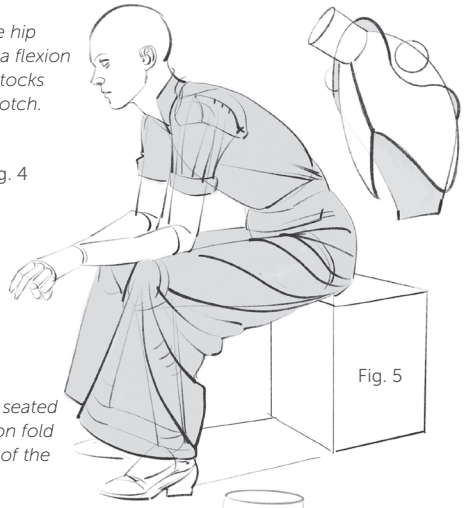


Fig. 5

Figs. 5 and 6: in a seated position, the flexion fold starts at the edge of the contact zone.

Fig. 7

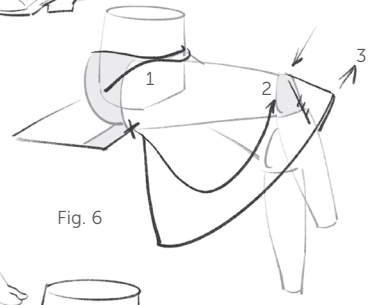


Fig. 6

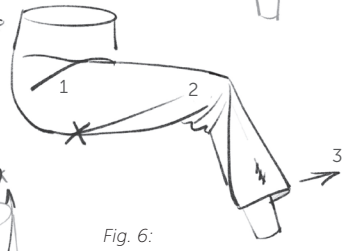
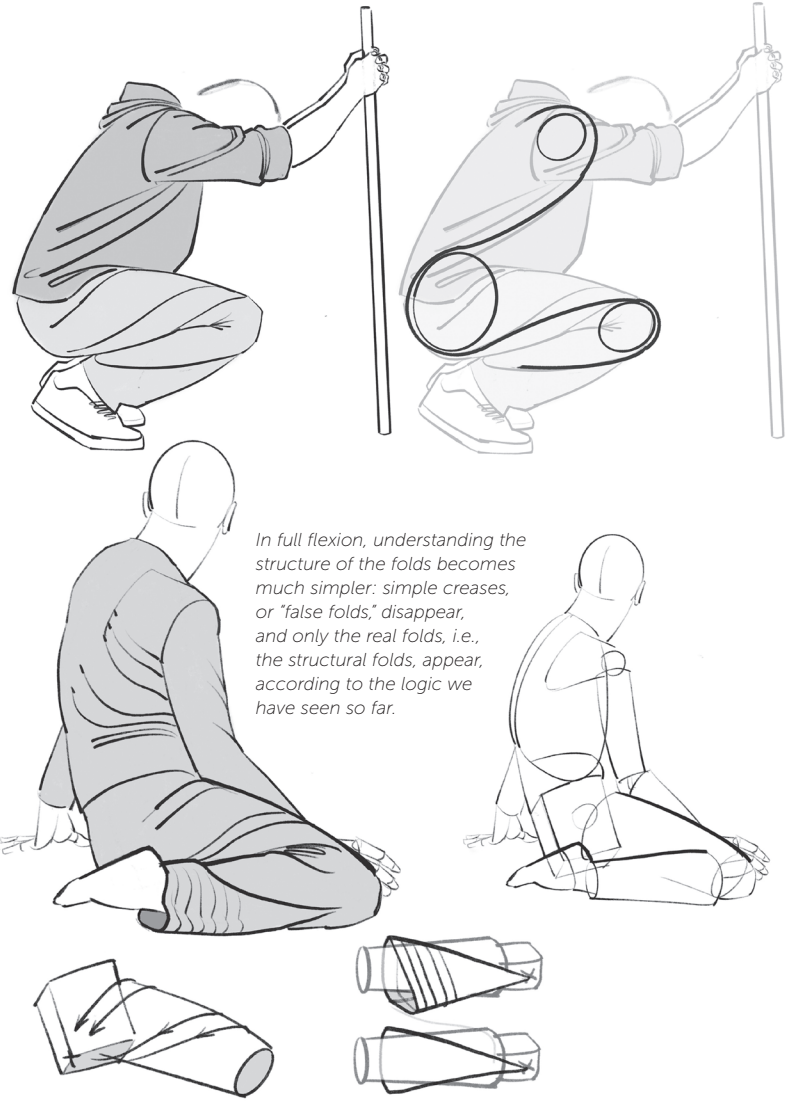
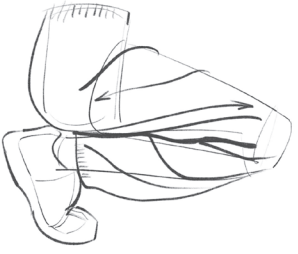
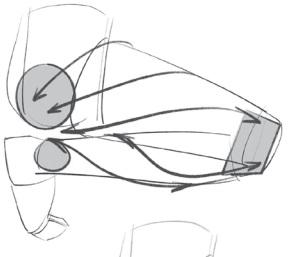


Fig. 6: correspondence between folds 1 and 2 and the triangular floating panel of fabric 3.

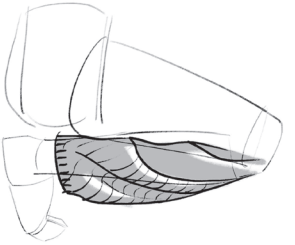


In full flexion, understanding the structure of the folds becomes much simpler: simple creases, or "false folds," disappear, and only the real folds, i.e., the structural folds, appear, according to the logic we have seen so far.





In full flexion, the flexion folds and the floating fabric panel underneath the knee are perfectly visible in spite of the presence of an elastic band at the ankle (opposite), on both the inside and the outside of the limb.



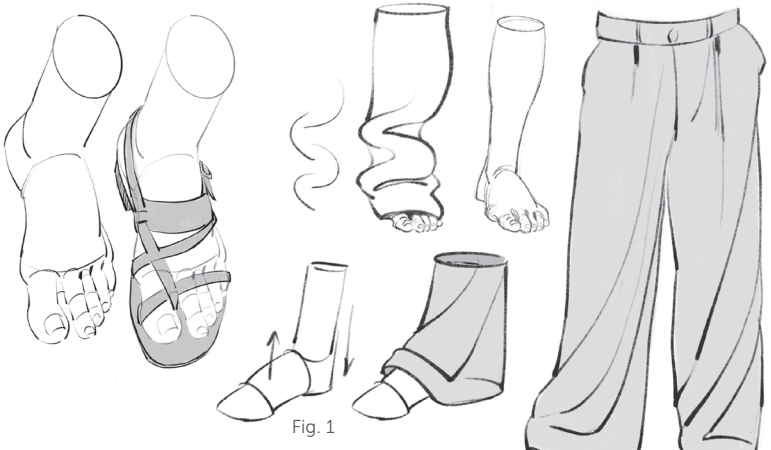


Fig. 1

Figs. 1 to 3: the foot imposes its thickness on long pants, which are pushed up at the instep.

Fig. 3

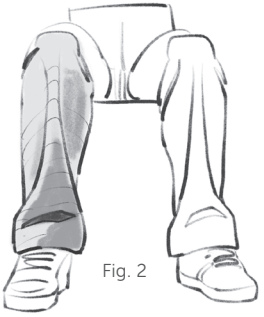


Fig. 2

Fig. 2: Stiff, thick fabrics (here, jeans) have a memory. The fold corresponding to the thickness of the foot is maintained in all positions.

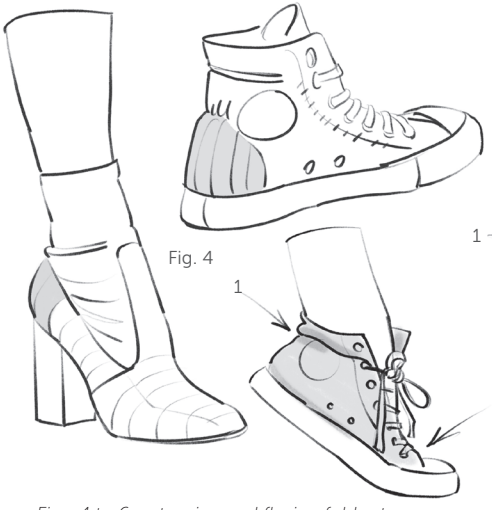
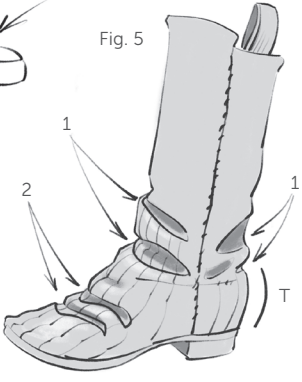
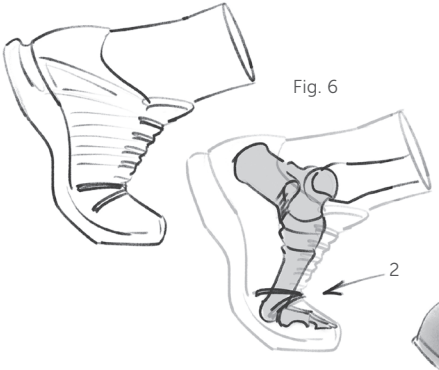


Fig. 5



Figs. 4 to 6: extension and flexion folds at the ankle (1), extension and flexion folds at the foot (2, at the level of the head of the metatarsals, fig. 6) and at the heel cup (T, shaded areas, fig. 4).



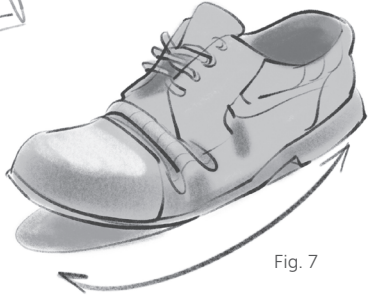
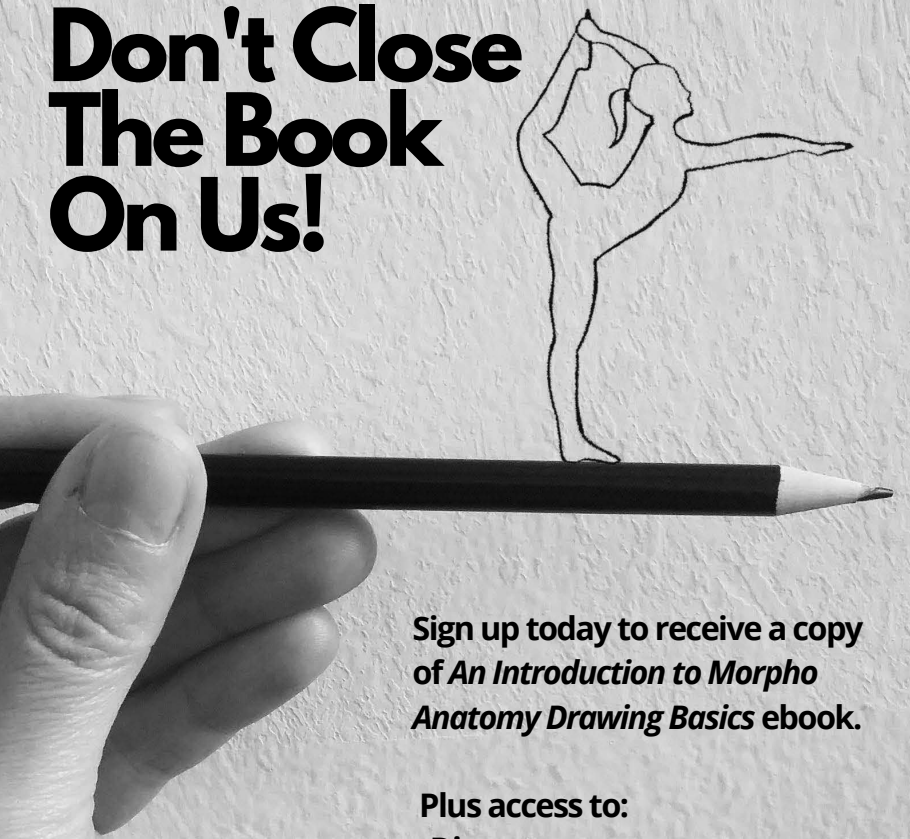


Fig. 7: imprint of walking folds on an old, curved, shoe sole.

resources

Most of the drawings in this book were made based on photographs that I took with my students or gleaned from the internet, complemented by screenshots from videos and films. I often allowed myself to trace these images while simplifying them in order to reveal the logic of the folds. This approach proved to be extremely rewarding. I recommend this simplified method to you as a first step; all of the artistic work you need to do will come afterward.

Don't Close The Book On Us!



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